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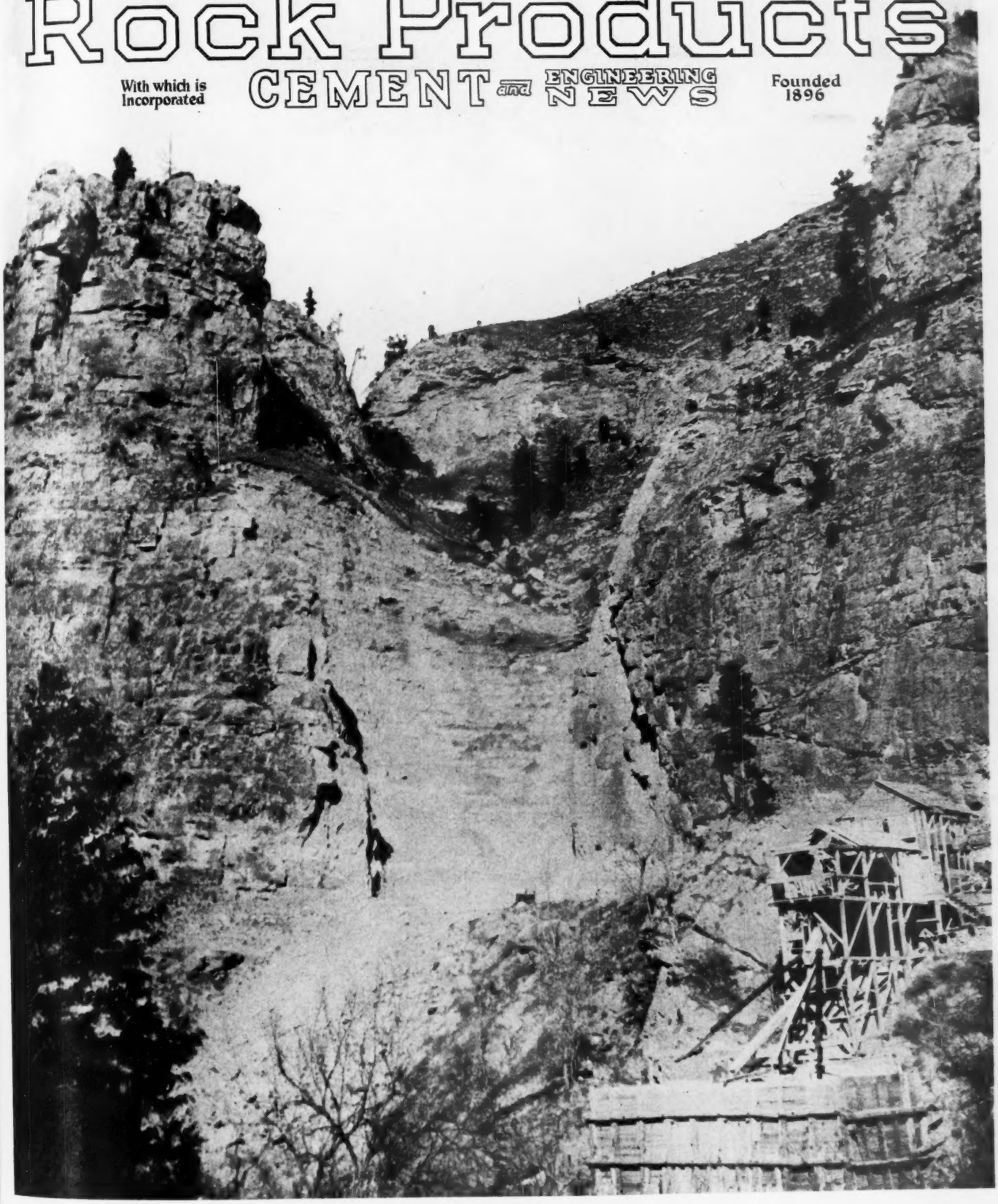

A quarry and crushing plant in the Black Hills of South Dakota

Rock Products Industry of South Dakota

Part II.—Limestone—Lime—Lithia —Mica—Ochre—Portland Cement

By Francis Church Lincoln
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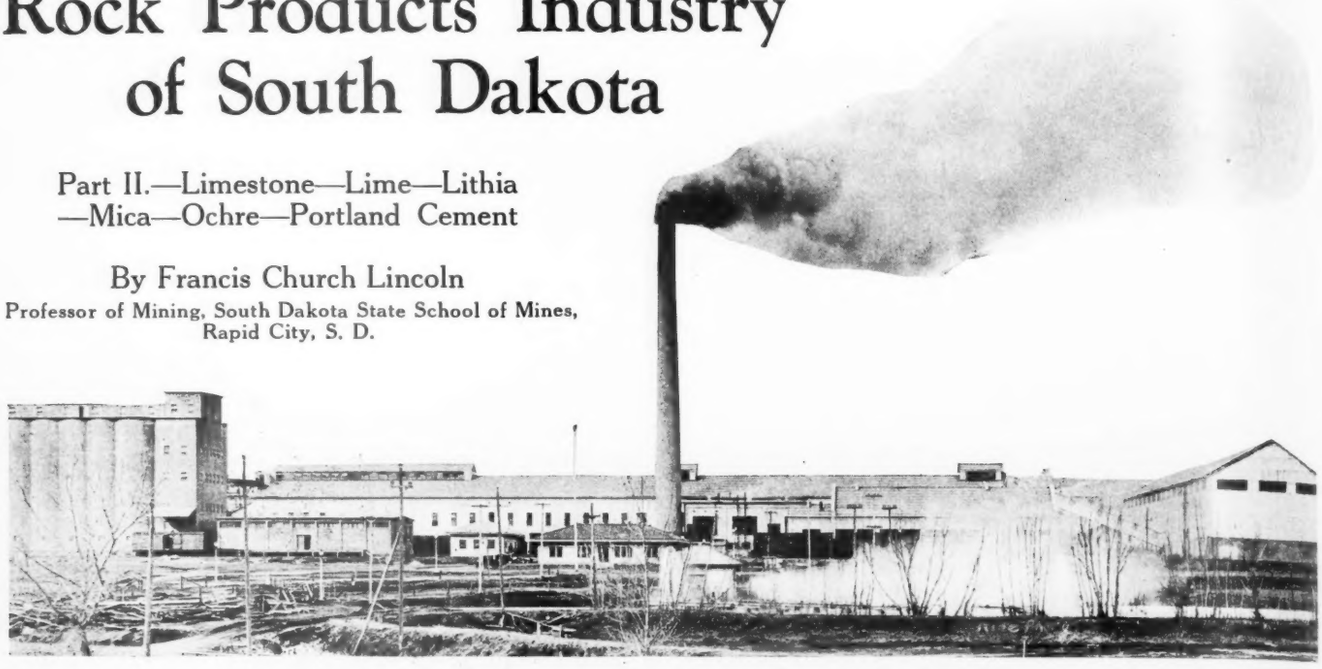


Panorama view of South Dakota state cement plant at Rapid City

THIS is the second installment of a series of three articles begun in the April 30, 1927, issue of ROCK PRODUCTS.

Limestone and Lime

A bed of high-calcium limestone from 30 to 50 ft. in thickness, which is known as the Minnekahta limestone and is probably of Permian age, occurs in the Black Hills. A ridge of this material forms the inner boundary of the Red Valley, from which the Black Hills gypsum is obtained; and this limestone escarpment, like the valley it bounds, outcrops all around the Hills in an immense ellipse. The Minnekahta limestone is used not only in the production of lime, but also in the manufacture of portland cement, for concrete aggregate, and as a decorative stone.

The Pahasapa limestone, of Mississippian age and several hundred feet in thickness, which forms a broad plateau farther toward the interior of the Hills, is a high-calcium limestone at Pringle, though high in magnesium elsewhere.

Lime was produced in the Black Hills on a small scale in the early days. At present there are three lime plants in operation; the small kiln of H. H. Lewis at Spearfish, the lime plant of the Homestake Mining Co. at Calcite, and the lime and hydrated lime plant of the Dakota Lime Co. at Rapid City. A fourth plant, which was operated in 1925 but is at present shut down, is the small kiln of John Erpelding near Pringle; and there is another kiln in this same neighborhood belonging to the Black Hills Lime Co., which, however, has not been used for a number of years. The quality of quicklime produced in South Dakota is indicated by the analyses in Table V.

TABLE V—SOUTH DAKOTA QUICKLIMES

	No. 1 Calcite[19]	No. 2 Rapid City	No. 3 Pringle[20]
CaO	88.60%	91.38%	92.80%
MgO	2.30	0.79	Trace
Fe_2O_3 and Al_2O_3	1.20	1.14	3.10
SiO_2	2.50	2.07	0.90
CO_2 and H_2O	4.20	4.60	3.20
	98.80%	100.00%	100.00%

[19]Analysis by chemist of Homestake Mining Co., Min. Res. 1911, p. 704.
[20]Analysis by chemist of Golden Reward C. G. M. & M. Co., Min. Res. 1911, p. 704.

H. H. Lewis has been burning limestone in a small kiln 1½ miles south of Spearfish for 25 years. His kiln is constructed of granite, burns wood and has a capacity of 1200 bushels of lime a month. In 1925 and 1926 he sold about 4000 bushels for local use.

The Homestake Mining Co. operates a limestone quarry and lime plant at Calcite on Elk creek, 3½ miles northwest of Piedmont. A narrow gage line belonging to the Burlington System transports the product to Lead, where it is all used by the Homestake Mining Co. The plant was erected in 1904 and has been in operation since that year. The annual production is about 2500 tons, all of which is used in cyaniding with the exception of some 40 tons employed to soften water. The burned lime contains from 80 to 85% of "available lime" desired for the cyanide process. Its general character is indicated by Analysis No. 1 in Table V. Foreman Evans is in charge at Calcite, working under the direction of Allan J. Clark, the company metallurgist at Lead, employing seven men when running kiln and quarry.

Special Blasting Practice

The quarry is located on the crest of a ridge behind the plant, where the Minnekahta limestone is present as a bed from 22 to 32 ft. in thickness. The limestone is quarried in two benches—an upper bench of from 16 to 20 ft. and a lower one of from 6 to 12 ft., the division into benches being made for convenience in drilling and in loading into cars and the height of the benches being determined by a natural seam which runs through the quarry. Holes are drilled by hand churn drilling with ¾- or ⅞-in. steel, sharpened at both ends, starting at 2 in. and finishing at 1½ in. Three men operate a drill, no handles being used, and a progress of about 1 ft. an hour is made. Holes 20 ft. deep are put down 20 ft. back of the upper face and shot one at a time. The holes are chambered three times with 1⅛-in. sticks of 40% dynamite—using six sticks at first, then from 20 to 25, and finally from 75 to 100 sticks. From 16 to 20 kegs of black powder are then loaded in the hole, and it is tamped and fired with a No. 6 cap and fuse. Secondary blasting is rarely necessary.

Cars of 1½-ton capacity are loaded by hand at the quarry face and trammed on tracks to a gravity plane which raises an empty car to the quarry at the same time that it lowers a full one to the plant. The plant contains one 8-ft. kiln in present use and one 7-ft. kiln held in reserve. The 8-ft. kiln burns an average somewhat in excess of eight tons per kiln-day using from 5 to 6 cords of seasoned pine wood—from 2600 to 3000 lb. of lime being produced per cord of wood consumed. This kiln discharges at the bottom into kiln cars, which run outside the plant on a trestle and dump their contents into box cars through holes in the car roofs. Floor storage is provided for from 8 to 9 carloads of lime, which, in

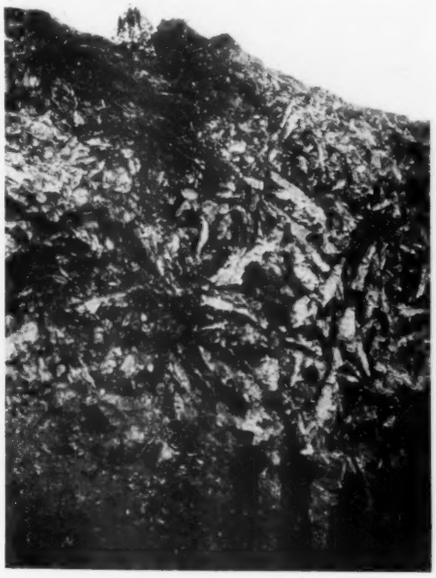
addition to the bin storage at Lead, makes it posible to shut down the plant for repairs without interfering with the lime supply.

The Dakota Lime Co., of which A. M. Lanphere is manager, is operating under lease a quarry, kiln and hydrator belonging to the bondholders of the Black Hills Rock Products Co., situated two miles northwest of Rapid City on the Chicago and North-Western railway. Hydrated lime, lump quicklime and ground quicklime are produced. Analysis No. 2 in Table V indicates the character of the lime made at this plant. An analysis of the hydrated lime by Charles Bentley of the Mining Experiment Station at the South Dakota School of Mines is as follows:

	Per cent
CaO	71.50
MgO	0.62
Fe_2O_3 and Al_2O_3	0.89
SiO_2	1.62
CO_2	3.60
Ignition loss (other than CO_2)	22.38
	100.61

While the Minnekahta limestone near this plant has a thickness of 40 ft., only the upper 20 ft. is at present quarried for convenience in transportation of the broken rock to the kilns. The 20-ft. face is mined in two benches, an upper bench of 12 ft. and a lower of 8 ft. Holes are drilled with a Jackhamer, which puts down a 12-ft. hole in about three-quarters of an hour. These holes are sprung three times with 2, 5 and 7 sticks of 40% dynamite and 5 or 6 in. of tamping. From 1 to 1½ kegs of black powder is loaded into each hole, and the holes fired three at a time with No. 6 electric caps.

There are three kilns in the plant, one in present use, one which is to be put into commission and a third which requires rebuilding. The two 8-ft. kilns have a maximum capacity of 25 tons a day. Coal is used as fuel, about 1200 lb. of lignite being consumed per ton of lime produced. About 90% of the quicklime produced is manufactured into hydrated lime. The quicklime to be hydrated is raised by bucket elevator from the cooling floor to a bin from which it is fed to a rotary crusher. The crushed lime is then raised by another bucket elevator to a bin above a Clyde batch hydrator. The lime is weighed in a scale hopper beneath the hydrator bin and water is added from a measuring barrel. The hydrator has a capacity of 25 tons a day. After hydration the lime is elevated to a storage bin from which a screw conveyor takes it to the sacker, where it is put up in 40-lb. paper sacks for shipment. The lump quicklime shipped goes out both in barrels and in bulk, and the ground quicklime in paper bags. During 1926, the Dakota Lime Co. produced 1746 tons of lime valued at about $17,460.



Spodumene "logs" in glory hole of Etta lithia mine at Keystone, S. D.

Lithia

Lithia was formerly used mainly for medicinal purposes, but now large quantities are employed in the manufacture of storage batteries and of glass. Lithia minerals occur in the pegmatites in the Algonkian core of the Black Hills, and particularly in those of the Keystone district. Three commercially important lithia minerals are found in this district—spodumene, a lithium aluminum silicate; amblygonite, a lithium aluminum phosphate containing fluorine, and lepidolite, commonly called lithia mica, a complex silicate containing from 4 to 6% of lithia.

The Etta mine is not only the most important lithia mine in the Keystone district but also the greatest lithia producer in the world. Opened as a mica prospect, tin was discovered in the Etta mine in 1883 and started the Black Hills tin excitement. In 1895, after the tin boom had subsided, Dean McGillicuddy of the South Dakota State School of Mines had the spodumene of the Etta mine analyzed in the school laboratories, and finding that it had an average lithia content of 6.16% endeavored to interest chemical manufacturers. In 1898, a carload of 30 tons of spodumene was shipped to Reinbold and Co. at Omaha for experimental purposes. Reinbold and Co. secured a lease on the property and, during 1899, it produced 500 tons of spodumene, and the following year 700 tons.[21]

The Etta mine was leased by the Standard Essence Co., now the Maywood Chemical Co. of Maywood, N. J., in 1905; purchased by that company in 1908, and operated by it practically continuously up to the present time. J. A. Cessna is superintendent at Keystone. The company produced 1000 tons of spodumene valued at $40,000 in 1925, and about 800 tons in 1926. The entire product of this mine is shipped to the plant of the Maywood Chemical Co., where the lithia is

[21] O'Hara, C. C., "The Mineral Wealth of the Black Hills," So. Dak. School of Mines Bull. 6 (1902), pp. 77-80.

Three-kiln lime plant and hydrating unit near Rapid City, operated by the Dakota Lime Co.

extracted and manufactured into various compounds.

The Etta spodumene deposit is an oval knob of pegmatite 200 ft. in length by 150 ft. in width. The spodumene occurs in crystals irregularly distributed in a pegmatitic ground mass consisting mainly of quartz and feldspar, but containing some 60 different species of minerals, many of which are rare. The spodumene crystals show great variations in size. Some are but a few inches in length, many are several feet long, and crystals with lengths of from 10 to 30 ft. are rather common. The largest crystal mined had a length of 47 ft. The general appearance of the large spodumene crystals exposed in the mine workings resembles that of logs, and "logs" they are called by the miners.[22]

The Etta mine was developed by tunnels, but a shaft is now being sunk. From the tunnels, stopes are raised to the surface where they are widened out into glory holes. The ground is broken by machine drilling and blasting with dynamite. No timbering is necesasry. The spodumene is sorted by hand and trammed to the mine ore bine, from which it is hauled by trucks to the railroad.

Lithia minerals have been produced by a number of other mines in the Keystone district, the most important of which are the Ingersoll, Peerless and Hugo. The Ingersoll mine is located four miles northwest of Keystone and belongs to W. S. Dewing and Denis Henault. It produced 14 tons of amblygonite valued at $840 and three tons of lepidolite valued at $60 in 1925, but made no shipments in 1926. The Hugo and Peerless mines are now being operated by the Keystone Feldspar and Chemical Co., which has been described under "Feldspar." This company mined and sorted a carload of amblygonite in 1926, but the mineral has not yet been shipped.

Mica

A good grade of muscovite mica occurs in the pegmatites of the Algonkian core of the Black Hills. These pegmatites are also the source of andalusite, feldspar and lithia minerals as described in previous sections. They were first mined for their mica contents, however, the McMackin mine, later known as the Crown, 2½ miles northwest of Custer, having been opened as early as 1879. By July 1, 1884, this mine had produced 45,000 lb. of sheet mica valued at $135,000; and this production added to that of three other large mica mines—the New York, Lost Bonanza and Climax—and several small mines, made the important total of 124,600 lb. of sheet mica valued at $442,859. In 1884, 11 producers mined 18,150 lb. of sheet mica valued at $63,525. The industry then declined and shipments did not again reach the 1884 production until the year 1899.[23]

In 1899, the output of sheet mica was 20,299 lb., valued at $18,000, and in 1900, 65,000 lb., valued at $45,000; and in the latter year the first shipment of scrap mica, consisting of 222 tons valued at $1554, was made. In 1906, a great impetus was given to the mica mining industry of South Dakota by the Westinghouse Electric and Manufacturing Co., which reopened the New York, White Spar and other mines and worked them actively till 1911. During the period from 1907 to 1911 the Black Hills region product about one-third of the mica produced in the United States—the annual output ranging from several hundred thousand to more than a million and a half pounds of sheet mica and from 300 to 1000 tons of scrap mica. With the closing of the Westinghouse mines in 1911 the production dropped until now it is very small. In 1925, three producers shipped 377 tons of mica valued at $9430; and in 1926 all three producers increased their shipments.

The present producers of mica in the Black Hills are the Keystone Feldspar and Chemical Co. and the Dakota Feldspar Co., whose mines have already been mentioned under "Feldspar," and W. D. Wood, of Custer. Mr. Wood works the Old Mike mine, 3¾ miles northwesterly from Custer, under lease. He produced 20 tons of mica valued at $3440 in 1925, while in 1926 he mined 150 tons of scrap mica and about one ton of sheet mica. Mr. Wood also did some mining at the Dakota Feldspar Co.'s mine near Pringle, and states that the mica in that mine is of much better grade than at the Old Mike, running about 50% of splitting grade. The Dakota Feldspar Co. shipped seven tons valued at $390 in 1925; and during 1926 shipped a carload of scrap mica to the Standard Oil Co. of Indiana at Whiting, and a number of small lots of mine run, punch mica and sheet mica to Chicago. The Keystone Feldspar and Chemical Co. made its first mica shipments in 1924 when it sent out five carloads weighing 225 tons and valued at $4500. The following year its shipments were increased to 350 tons of scrap mica with a value of $5600; and last year 21 carloads of mica were shipped. These shipments go to the United States Mica Co. at Chicago.

Ochre

In the vicinity of Rochford and Nahant in the interior of the Black Hills occur deposits of bog limonite derived from the pyrite and pyrrhotite in the slates and schists of that region. An analysis of this material by Prof. M. F. Coolbaugh of the State School of Mines is as follows:

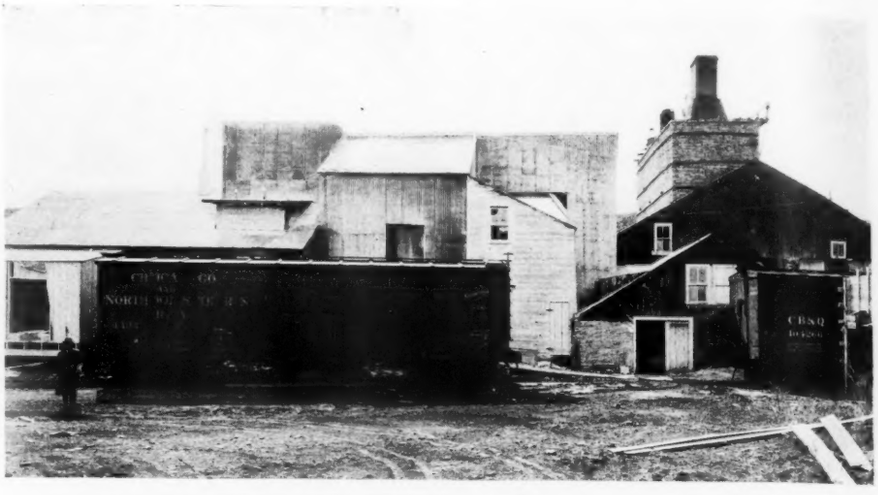
	Per cent
Fe	53.80
SiO_2	3.90
S	0.57
Al_2O_3, P, CaO, MnO_2, MgO, each	Trace

There has been an occasional demand for this ochre for use in paint, and a paint mill was operated intermittently at Custer until it burned down some time prior to 1914. About 1901, 30 carloads of bog limonite were mined near Rochford, ground in the Mineral Paint Works at Custer and shipped to Aurora, Ill., to be manufactured into paint.[24] In 1914, it was estimated that some 150 to 200 tons of bog limonite had been mined from the district and used in paint manufacture.[25]

A shipment of 500 tons of this ochre was made in 1925. The limonite was mined by Albert Hausle from an open pit on the Johanna Hausle property about three miles from Rochford, hauled by team to the railroad and brought $3.75 a ton f.o.b. It was shipped to George S. Mephann and Co., East St. Louis, Ill. No ochre was mined during 1926.

Portland Cement

Portland cement was first manufactured in South Dakota by the Western Portland Cement Co., which constructed a 250-bbl.



Another view of the lime plant near Rapid City operated under lease by the Dakota Lime Co.

[22]Connolly, J. P., "The Etta Mine," Black Hills Engineer, 13 (1925), 18-23.

[23]Clarke, F. W., "Mica," Mineral Resources, 1883-1884, pp. 906-914.

[24]O'Harra, C. C., *op. cit.*, p. 63.

[25]Ziegler, V., "The Minerals of the Black Hills," Bull. 10, S. D. School of Mines (February, 1914), p. 120.

wet-process mill at Yankton in 1889-1890 and produced cement for 20 years. This plant utilized the Niobrara chalk and the Pierre shale, both of Upper Cretaceous age. Analyses of the raw materials and finished product are given in Table VI. The mill originally burned its slurry in six Johnson stationary kilns, but these were later replaced by rotary kilns. The competition of large new cement plants to the eastward, and the necessity for selective mining which arose as a result of impurities such as secondary gypsum in the raw material forced the Western Portland Cement Co. to shut down in 1910.

An amendment to the constitution of South Dakota permitting the state to engage in cement manufacture was passed by the 1917 legislature and approved by the electorate in 1918. A state cement commission formed in 1919 investigated the various locations in the eastern and western parts of the state which were suggested as sites for the state plant, and decided in favor of Rapid City in the Black Hills. Ground was broken there on May 15, 1923, a 2000-bbl. wet-process plant constructed, and the first shipment of cement left the mill on January 26, 1925.

The control of the South Dakota State Cement Plant is in the hands of the South Dakota State Cement Commission, which consists of four commissioners, with Governow Bulow as *ex officio* chairman. The business of the commission is directed largely by its secretary-treasurer, George Philip, of Rapid City; while the technical management of the plant is confided to William Fowden. The head chemist is William A. Ernst.

Opponents of state ownership have subjected the Rapid City enterprise to a great deal of adverse criticism, much of which has been unwarranted. The mill has established a Rapid City base price of $1.80 a barrel, according to customary procedure, and conducts its competition for markets along the usual lines. The sales during 1925 amounted to 337,539 bbl., and last year exceeded 400,000 bbl. The cement commission estimated that in 1926 the state plant sold 82% of all cement used in the state. It also sold cement in the adjoining states of North Dakota, Minnesota, Iowa, Nebraska and Wyoming.

The cement plant and limestone quarry occupy a site two miles northwest of Rapid City on the Chicago and North Western railway, adjoining the lime plant and quarry operated by the Dakota Lime Co., which has already been described. The shale quarry is located on the railroad 8 miles east of the mill. Gypsum is purchased from the Dakota Plaster Co. at Black Hawk and from the United States Gypsum Co. at Piedmont. Coal is obtained from the Sheridan and Rock Springs districts in Wyoming and from Colorado.

The limestone employed is the Minnekahta, of probable Permian age, which is about 40 ft. in thickness at the cement plant quarry and has the composition indicated by Analysis No. 4 in Table VI. Blast holes are bored with a Sanderson-Cyclone gasoline well drill using a 5⅞-in. bit at an average rate of 5 ft. per hour. The bits are good for from 5,000 to 10,000 ft. of hole and are then sharpened with an Armstrong Model 6 drill sharpener. Holes were formerly loaded with 40% gelatin dynamite, using about 150 lb. to a hole; but the management is now able to secure Pyrotol, a reconditioned trinitrotoluene powder, at a low price, and is using that explosive in 5x16-in. cartridges for primary blasting, while still employing the gelatin dynamite for what little secondary blasting is necessary. Two Ingersoll-Rand Jackhamer drills are provided for blockholing and supplied with air by an Ingersoll-Rand 12x10-in. single-stage air compressor. A Type 50B Bucyrus steam shovel with caterpillar tread loads the broken limestone into 5-ton side-dump cars which are hauled over a 36-in. gage quarry track by a 20-ton 11x16-in. saddle-tank Porter locomotive to the neighboring crusher house. Six men are employed in the limestone quarry, and two in transportation.

The shale used is the Pierre shale of Upper Cretaceous age, the same shale which in the southern Hills is exploited for its bentonite beds. The composition of this shale is indicated by Analysis No. 5 in Table VI. As this shale has a thickness of 1200 ft., the height of the quarry face is regulated by convenience. The shale is suffi-

TABLE VI—SOUTH DAKOTA PORTLAND CEMENTS AND RAW MATERIALS

	Western Portland Cement Co. Yankton[26]			So. Dak. State Cement Plant Rapid City[27]		
	No. 1 Chalk	No. 2 Shale	No. 3 Cement	No. 4 Limestone	No. 5 Shale	No. 6 Cement
SiO_2	4.14%	61.53%	22.00%	2.92%	56.32%	22.23%
Al_2O_3	1.81	20.74	7.74	0.54	18.84 }	10.57
Fe_2O_3	2.72	4.01	4.61	0.46	7.11 }	
MnO_2	.....	.....	.....	.....	0.86	.....
CaO	51.00	5.28	59.50	53.40	2.09	62.28
MgO	Trace	1.72	0.90	0.46	2.70	1.83
Alkalies	Trace	2.29	1.20	.....	.....	.....
S	0.50	1.26	.....	.....	.....	.....
SO_3	.....	.....	0.80	0.06	1.14	1.72
CO_2	39.99	3.09	0.50	.....	.....	.....
H_2O	.....	.....	0.60	.....	.....	.....
Loss on ignition	.....	.....	.....	42.37	10.19	0.71
	100.16%	99.92%	97.85%	100.21%	99.25%	99.34%

[26]Smith, W. A., "Cement" Mineral Industry During 1892, I (1893), 52.
[27]Lincoln, F. C., "South Dakota's State Cement Enterprise," Eng. and Min. Jour.—Press 120 (1925), 365-367.

Power shovel working in limestone quarry of the state cement plant

Stock-piling cement clinker with a gasoline crane at the state cement plant

ciently soft to be mined without blasting. A Type 20B Bucyrus Diesel-engine powered shovel with caterpillar mounting is employed to mine the shale, which is loaded into standard gage railroad cars for transportation to the raw materials storage building at the cement plant. Two men are employed in the shale quarry. The mining of the Black Hawk and Piedmont gypsum used in the cement plant has already been described under "Gypsum."

Upon arrival at the crusher house, the quarry cars loaded with limestone dump directly into the mouth of a 20-in. Superior McCully gyratory crusher which reduces the material to a maximum size of 4 in. It is next conveyed to a 36x42-in. Jeffrey swing hammer pulverizer which further reduces it to a maximum diameter of ¾ in. The crushed limestone is then carried 350 ft. on a 24-in. belt conveyor to the raw materials storage building. This building is 80 ft. in width and 408 ft. in length, and is used for the storage of shale and coal as well as of crushed limestone. A standard gage track enters the building, and on this the cars of shale and of coal arrive. These cars are unloaded by a 6½-ton electric crane equipped with a 2½-cu. yd. bucket which travels the full length of the building. This crane also serves to deliver the shale and the limestone to a two-compartment loading bin. Feeders at the bottom of the limestone and shale compartments of this bin are so arranged that they can be set to deliver the limestone and shale in any proportion desired. The mixed limestone and shale fall upon a 24-in. belt conveyor 130 ft. in length which carries the mixture to two steel bins in the mill.

At the mill the limestone and shale mixture is ground to a slurry with from 30 to 34% of water in two 7x22-ft. Compeb mills. 5-in.-2½-in. balls are used in the first compartments and 1¼-in. in the second. 1⅛-in. concavex and 1⅛x2-in. slugs have also been tried in the fine compartments without noticeably different results. Balls are charged once a month. The discharges from the Compeb mills are caught in a slurry pit from which they are pumped to any one of six cylindrical reinforced-concrete tanks which are 20 ft. in diameter by 40 ft. in height and stirred by compressed air. A second slurry pump forwards the slurry from any one of the six storage tanks to either of two mechanically-stirred correction tanks 20 ft. in diameter and 20 ft. high, where the contents of the different storage tanks are blended to produce a kiln feed of the desired chemical composition. A third slurry pump raises the blended slurry from either correction tank to either of two Ferris wheel feeders delivering to the kilns.

The slurry is burned to clinker in two 10x150-ft. rotary kilns using coal as a fuel. No coal having the desired properties being available, a blended coal is employed consisting of about 60% Sheridan coal and 40% Rock Springs or Colorado. Analyses of these coals are given in Table VII. The coal is ground in the adjoining coal mill, to which it is brought in railway cars which discharge into a track hopper. An apron conveyor carries the coal to a pair of Link-Belt Type A 26x24-in. toothed rolls, which crush it to about 1-in. diameter, although some is coarser. The crushed coal is elevated to a bin from which it is fed to a 7x50-ft. Ebro dryer equipped with mechanical stoker. As shown by the analyses in Table VII, the coal is high in moisture when received, and since it goes into the dryer in rather coarse pieces, it retains from 6% to as high as 15% of moisture when fed to the pulverizers. From the dryer pit the partially dried coal is elevated to the bins above three Raymond 5-roller mills. These mills pulverize the coal until 95% passes a 100-mesh screen, and their cyclones deliver the powdered material to a screw conveyor which carries it to the kiln feed coal bins. High-speed fans, 50-in. diameter, force the pulverized coal through burners into the discharge end of the rotary kilns.

TABLE VII—AVERAGE ANALYSES OF COALS USED AT STATE CEMENT PLANT[28]

Locality	Moisture as Received	Proximate Analysis on Dry Basis: Volatile Matter	Fixed Carbon	Ash	S.	B.t.u.
Sheridan, Wyo.....	25.16%	49.99%	44.20%	5.83%	0.89%	11,606
Rock Springs, Wyo.....	11.64	42.46	51.16	6.38	.....	12,995
Colorado	12.37	39.63	50.50	9.87	0.60	12,521

[28]Analyses kindly supplied by Mr. W. A. Ernst.

The hot clinker formed in the kilns drops to two 8x60-ft. rotary coolers which preheat the air going to the kilns. A pivoted-bucket conveyor then carries the clinker to an outside storage pile where it is handled by a Northwest gasoline-powered crane equipped with clam-shell bucket and caterpillar tread. The pivoted bucket conveyor, after discharging its load, returns beneath the storage pile and is used to reclaim the clinker, carrying it back into the mill and delivering it to two bins above the finishing grinders. From 3 to 3½% of gypsum in lumps with ¾-in. maximum diameter is added to the clinker and the mixture ground in two 7x22-in. dry Compeb mills. The finished portland cement discharged from these mills is transported by elevators and conveyors to the stock house, where there are six bins of the silo type, 32 ft. in diameter by 72 ft. in height, which are arranged in two rows of three; bins and interstices holding 100,000 bbl. of cement. When making shipments, cement is withdrawn from storage by means of conveyors and elevators and carried to two packing machines which automatically fill and weigh the bags; when a 30-in. belt conveyor takes the filled bags to the door of the freight car in which they are to be shipped.

Power for running the plant is obtained by passing the hot gases from the kilns through two Babcock & Wilcox waste-heat boilers, each with a heating surface of 6694 sq. ft. and equipped with a Green economizer and superheater. There is a 300-hp. auxiliary boiler for use in starting the plant and in emergencies. The steam produced operates two 1000-kw. 2300-v. turbo-generators which supply electric power to motors throughout the plant. The electrical installations in the power plant include one 27½-kw. motor generator set, three 333-kv. single-phase transformers, and 2300-v. and 440-v. switchboards. Two jet condensers are in use and the water is softened by a Permutit installation of 120,000 gal. daily capacity. A Cochrane 1200-hp. open type feed-water heater is employed, and the water is handled by means of two 12x10x12-in. general service tank pumps and two 12x7x12-in. boiler feed pumps. The power plant also contains two 12x10-in. single-stage air compressors of 324 cu. ft. capacity and two air receivers of 860 cu. ft. capacity at 100 lb. pressure.

About 75 men are employed in the plant and 10 in the quarries, making a total of 85 men, which is sometimes increased by the employment of additional laborers. The monthly payroll is in the neighborhood of $15,000.

The cement produced has the chemical composition indicated by Analysis No. 6 in Table VI. It is of the highest quality, tests on its tensile strength giving results far above the standard.

(To be concluded)

Quebec Asbestos Outlook

THE Canadian Asbestos Co., of Montreal, says that asbestos mines will have a good year in 1927. The statement reads:

"During the year 1926 the prices of crude asbestos were gradually stabilized on a plane to permit the mining companies to pay living wages and earn some profit on the investments of capital. The asbestos manufacturing concerns have been slow in following the lead of their mining colleagues and up to the beginning of 1927 continued to take orders at prices that in many instances were below cost. We are all realizing that the policy of taking orders regardless of price, brings benefit to no one and disorganizes business all around. One after the other asbestos manufacturers have decided to maintain prices on a level commensurate with their costs, which owing to advance in price of raw materials have increased considerably during the past year. It is more satisfactory to all concerned to do a little business at a profit than to do an immense trade at a loss.

"The asbestos mining industry, after many ups and downs and after a year's fight to maintain prices on a profitable basis, has entered the year 1927 with every prospect of a successful year.

Development of the German Cement Industry

German Portland Cement Manufacturers' Association a Great Factor in Its Extension

By Dr. C. R. Platzmann
Berlin, Germany

JANUARY, 1927, marked the fiftieth anniversary of the founding of the German Portland Cement Manufacturers Association. Half a century may appear to be a short period of time from the point of view of a historian; it gains in importance, however, when one reviews the changes in the economic and engineering world during the last 50 years. Fifty years ago the now highly organized American portland cement industry was non-existent; the number of plants in Europe as compared with the present day was extremely small, while all other continents were still plunged in medieval obscurity with no indication of beginnings of industry. The fiftieth anniversary of the German Portland Cement Manufacturers Association, an organization with scientific and technical aims, may be a good occasion to familiarize American manufacturers with the gradual development of a large and eminently essential industry of central Europe.

At the time of the centennial celebration of the discovery of portland cement in 1924 insufficient credit was given to men, who—due credit being given to John Aspdin—were paving the way for the discovery before his time or as contemporaries, making use of scientific methods. While Aspdin was after all but a practical man working empirically and lacking all scientific background, who "discovered" rather than invented portland cement, these men prepared the technical basis of the present day cement industry, which alone makes rational manufacture possible.

Other Early Investigators

The first man to break down the time honored belief that only the hardest limestone was suitable for building purposes was the Englishman Smeaton (1724-1792). His tests, made during the construction of the Eddystone lighthouse, led him to believe that purest limestone was not the best material for making mortar, particularly where it was to be exposed to water. Further he found that a certain proportion of clayey constituents furnished the best measure of the suitability of the lime for such construction work. He also observed very similar effects with trass and puzzolans, and established the fact that an admixture of argillaceous matter to so-called purest limestone did not produce the same results as the argillaceous constituents present in a limestone from the beginning, i.e., chemically combined.

The first German investigator of note in the field of cements was J. F. John (1782-1847), professor of chemistry in Berlin. When the Dutch Scientific Society at Haarlem offered a prize for the solution of the following (1810): "What is the chemical cause of the fact that lime made from limestone rock generally makes for a stronger and more durable masonry than a lime made from shells and what are the methods of correcting this deficiency of the 'shell' lime?" John started his work in 1815 and completed it in 1819, at which time it was published. He received a gold medal for his researches. In his tests he was led to the conclusion that the burning of common limestone resulted in (1) loss of moisture and carbon dioxide and (2) chemical reaction of part of the lime with the fine particles of silica, alumina and metal oxides, the latter reaction being the only reason for the silica content in mortar. Only one step separated him from his most important conclusion. His tests further proved that admixtures of clay, silica and iron oxide to shell limestone resulted, when calcined, in a true rock limestone lime with a high content of what he designated "Caementum." Had he specified calcination to a sintering point, John would have been the real discoverer of cement.

THIS year the German Portland Cement Manufacturers Association is celebrating its fiftieth anniversary. The jubilee festival planned to take place in March at the time of the annual association meeting was postponed to August 31 and September 1 and 2 because of the sudden death of Dr. Müller, president of the association for the past 18 years. Since the association has been the chief contributing factor to the success of the German portland cement industry and provided also a good share of technical progress made by other nations, we believe that the brief historical review of the German industry will be of exceeding interest to our readers.—The Editors.

It is not unusual to find that scientific discoveries are made simultaneously by different investigators of the same problems. Thus L. J. Vicat (1786-1861) published in 1817 his work on "Experimental researches on structural limes, concretes and common mortars." He was also led by his tests to an artificial manufacture of hydraulic lime by calcining a mixture of high calcium limestone and clay. He also found that separate calcination of these two constituents did not produce the same results. While Vicat's practical experiments led to the development of a more or less extensive industry in France, John's purely scientific work remained without following in Germany.

It is only after recalling to mind some patents for the manufacture of Roman cement by Dobbs, Frost, Saint-Legers and Tikell that we come to Aspdin in 1824. In view of all that has been written about the latter in 1924, no further comment will be made here.

As stated above, John's work remained without practical application. It was only in 1829 that Dr. J. N. Fuchs published his work on lime and mortar, for which he was equally awarded a gold medal by the Haarlem society. He pointed out that in southern Germany there existed limestones with an alumina content of up to 30% which should be suitable for Roman cement, common in England at that time. This led to the gradual formation of an extensive Roman cement industry in Bavaria.

Early Cement Industry of Bavaria

A perfect natural cement could have been manufactured in Bavaria in those days, similar to that manufactured today at Ulm and in adjoining parts of Austria. However, in those days the producers were afraid of dead-burning the argillaceous limestones and did not possess the grinding machinery required for clinker grinding. These circumstances checked progress in this direction. The production of Roman cement in upper Bavaria in 1865 amounted to 166,700 Ztz.*; this figure rose to 223,000 Ztr. in 1869. It

Translated by M. A. Corbin, Chicago Heights, Ill.

*Note by translater: Zentner—100 German pounds.

is sufficiently indicative of the growth of the industry to state that in 1872 the six plants located in the Rosenheim district alone manufactured more than 330,000 Ztr. The Staudacher Roman cement popular at the time, which was also first used as cement roofing tile, had the following composition: 57.7% CaO, 1.54% MgO, 5.2% Al_2O_3, 8.4% Fe_2O_3, 1.8% MnO, 22.4% SiO_2, 2.1% CO_2. The rise in production of Roman cement continued until 1879, in which the total production in Bavaria amounted to 2,000,000 Ztr. Competition with natural and portland cement caused this industry to decrease continuously since that time. As in upper Bavaria, a Roman cement industry was established in the vicinity of Ulm by a pharmacist, Dr. G. Leube. The first plant in this locality (1838) used limestone as raw material, which was burned in small lime kilns with open wood fire. Calcination was carried to the point of decarbonation, the product crushed in stamp mills and ground. The power to operate the equipment, about 35-hp., was obtained from a water-wheel. The installation of screening devices after a few years resulted in a uniform product, which found extensive demand. The manufacture of natural portland cement was begun only in 1864 and that of artificial portland cement in 1882.

Strangely enough the portland cement industry of later years did not develop directly from the Roman cement industry in southern Germany. It was introduced from England and owes its beginnings to Dr. Bleibtreu, who started a portland cement plant near Stettin in 1855 upon returning from England, where he had studied conditions of manufacture. An earlier plant established in 1850, operating on a very small scale, was soon given up. Its operation was based on purely empirical methods instead of scientific principles. It is doubtful, however, that Bleibtreu was able to obtain much information from the English manufacturers, who carefully guarded their plans from the intrusion of foreigners. It is much more probable that his tests and years of investigation of the problem led him to rediscover the manufacture of cement. The plant opened in 1855 produced 50 to 100 bbl. daily. Of the three shaft kilns each one was operated but once each week, the coke consumption being about 60 kg. per bbl. The power needed for grinding equipment, etc., used an additional 32 kg. per bbl. of cement produced.

The new industry developed rather rapidly as shown by the tabulation below, which gives the number of plants opened within the indicated periods:

	Plants
1855-1864	14
1865-1874	11
1875-1884	6
1885-1894	16
1895-1904	31
1905-1914	31
1915-1924	4
Total	113

In reviewing the development of industrial technique, we find that the progress achieved here follows closely the development of machinery in general.

Quarrying by pick and shovel and drilling with steel and sledge hammers was superseded by the two-man hammer drill, which was replaced in its turn by blasting with black powder and working in terrasses, while transportation was effected by means of pushcarts and tip wagons. In recent times drilling with compressed air and blasting with safety explosives and dynamite has succeeded the earlier methods. Quarrying in terrasses was also replaced by big blast hole drilling. The hauling of the rock was successively accomplished by means of overhead or underground cable or chain, in cable cars and finally in large automatically dumping wagons hauled by benzine, steam or electric engines. The latest achievement in this domain is represented by blasting with liquid air produced on the job.

The power generation followed all the phases of development of the steam boiler, beginning with the now obsolete beam engine and leading up to electric power.

The machinery used in crushing of raw materials has followed the progress of the crushers. The most important types used were stone crushers, edge runners, crushing rolls, jaw and gyratory crushers, hammer mills, ball, tube and compartment mills, which represent the latest phase of modern development.

Progress in Kiln Design

The fuel used in the shaft kiln was formerly shaped into briquets with ordinary clay binders and pressed in brick presses. This method was supplanted by tamping presses which in turn gave way to the modern rotary press.

The small shaft kilns working intermittently were replaced by coke fired continuous kilns and ring kilns borrowed from the clay industries. The introduction of the Dietz stage kiln and the Schneider type of shaft kiln ushered in a new period in kiln design. The next step was the rotary kiln with cooler and its improvement by enlarging the burning zone. The latest phase is the Stehmann kiln characterized by a shaft cooler and accurate control of air supply for maximum economy of fuel. The special conditions of German industry led to automatically operated dust-free shaft kilns, whose capacity approximates that of rotary kilns and which are furnished with rolling, plane or revolving grates. Their advantages are constituted by economic fuel utilization.

Early Cement Mill Equipment

The grinding of the clinker began in crushing and rolling mills, edge runners, etc., and progressed to ball and tube mills, now superseded by compartment mills, as in the grinding of the raw materials. The cylindrical sieves once used were replaced by cyclones and separators.

The secondary problems involving hauling, packing and dust collection have also gone through many intermediate stages before reaching the present stage of minimum cost of operation.

The close co-operation of German machine industry with cement companies is responsible for the progress achieved, resulting in a constant reduction of the cost of production and constant rise in capacity. The relatively young American cement industry can hardly realize the technical difficulties which the European manufacturers had to solve in remodeling their plants to bring them up to date.

The growth of the German cement industry and the amplified scientific knowledge led to the manufacture of special cements, which are of great interest in this connection. The so-called high strength and fused cements manufactured in Germany within the last years will not be discussed, as they were first introduced in other countries, though even before the war the Heidelberg plants marketed a cement of high strength properties.

Special Portland Cements

F. Schott was first to point out that a cement free from alumina, containing but silica, iron oxide and lime, was resistant to the action of sulfates. As early as 1901 the Krupp Co., Essen, obtained a patent for the manufacture of an ore cement resistant to sulfates, manufactured at the portland cement plant at Hemmoor. Extensive tests have actually shown that this cement, which complies with the specifications, is more resistant to the aggressive action of sulfate waters than portland cement. Its composition is the following: 20.73% SiO_2 3.44% Al_2O_3, 6.55% Fe_2O_3, 2.97% MnO, 65.29% CaO, 1.17% SO_3, 0.30 MgO. Its manufacture is quite similar to that of portland cement except that the standard alumina content is replaced by iron oxide. This ore cement is of a chocolate brown color with a specific gravity somewhat higher than that of standard portland cement.

Cement users have frequently emphasized the desirability of obtaining a white cement. This was of particular moment to the cement products manufacturers. The first patent for the manufacture of a white cement in Germany was taken out in 1884. This cement was made of quartz and chalk and was to be mixed with a dilute water glass solution. The Heidelberg plant also manufactured a white cement in the 80's of kaolin and a specially pure limestone. In recent years the "Stern" Co. in Finkenwalde near Stettin has produced a white cement whose raw materials are characterized by a high degree of purity. Fine mesh coke yielding a white ash or lignite briquets are used to advantage for this purpose. A very good white cement is obtained from monocalciumaluminate, which as yet is not manufactured on a commercial scale because of the high cost of pure alumina.

Cement From Gypsum

One of the most interesting special ce-

ments is that manufactured from gypsum, whose manufacture was successfully introduced in Germany a few years ago. In burning a mixture of gypsum with alumina or silica, sulfuric acid is liberated as sulfur dioxide. The addition of finely ground coke makes this reaction quantitative, while basic silicates and aluminates, corresponding to the composition of the cement clinker, are left as residue. The cement plant of the J. G. Dye Co. uses this process, utilizing the following raw materials: Anthracite, gypsum, shale and coke. The clinker obtained is ground with 70% blast furnace slag. The flue gases containing 6 to 7% SO_2 are led through an electric dust collecting chamber, washed and carried to the sulfuric acid plant. The monthly output at the present time is about 3000 tons cement clinker and 1800 tons sulfuric acid.

It has been known for years that certain kinds of blast furnace slag possess hydraulic properties. This led to the formation of the German iron-portland and slag cement industries. The first plants of this group were built in the 90's of the past century. These cements are made by calcining limestone and slag mixtures and are subsequently pulverized with varying admixtures of slag. The iron-portland cement plants are limited by their specifications to add not more than 30% of slag subsequent to calcination, while the slag cement plants add up to 85% basic slag, granulated by rapid cooling of the molten mass. The following modulus is used in preparing the slag cements:

$$\frac{CaO + MgO + \frac{1}{3} Al_2O_3}{SiO_2 + \frac{2}{3} Al_2O_3} > 1$$

The cements used in the manufacture of both cements must conform to the cement specifications of the German Portland Cement Manufacturers Association, a maximum of 5% MnO is put on the blast furnace slag cement.

Association History

A most graphic idea of the development of the German cement industry is gained by reviewing the history of the German Portland Cement Manufacturers Association, which celebrated its semi-centennial anniversary in 1927, and which directs its activities to scientific and economic purposes. The founding of the association took place in January, 1877, and it owes its existence to Dr. Delbruck. Twenty-three plants joined at the time and the members decided unanimously that the most important problems of the moment were (1) standard testing methods for their manufactured products and (2) specifications representing the requirements of quality expected of cement. The first standards approved by the committees were published in 1878. Denmark, Sweden and Austria accepted the German standards and even the testing laboratory in Melbourne followed German procedure. John Grant, the authority of the time on methods of tests endorsed the main points of German standards. Since that day the association has worked continuously on the perfection of the standards. As early as 1880 the specifications were revised to permit the addition of 2% of slag to regulate the set of the cement. Excess of this amount was considered as an adulterant. Later years saw extensive studies of the effect of magnesia with a corresponding revision of the standards to exclude cements containing more than 5% MgO.

Advance in Standards

The changes in the requirements of portland cement with the time are best reflected in the following:

1878—Fineness: 20% retained on 900-mesh sieve (per sq. cm.).
Tensile strength at 28 days (1:3) ..... 10 kg. per sq. cm.
1886—Tensile strength at 28 days (1:3)..... 16 kg. per sq. cm.
Compressive strength at 28 days (1:3) .....160 kg. per sq. cm.
1909 — Fineness: 5% retained on 900-mesh sieve.
Tensile strength at 7 days (1:3) ..... 12 kg. per sq. cm.
Compressive strength at 7 days (1:3) .....120 kg. per sq. cm.
Compressive strength at 28 days (1:3) cured in air and water.....250 kg. per sq. cm.
Compressive strength at 28 days (1:3) cured in water .....200 kg. per sq. cm.

It is expected to raise the standards again before long, introducing the following values:

Fineness: Retained on 900-mesh sieve.... 2%
Retained on 4900-mesh sieve..20%

PROPOSED NEW STANDARDS FOR GERMAN CEMENTS*

Compressive strength	Portland cement	Portland cement	High-strength portland A cement
After 3 days water curing..	.....	.....	250
After 7 days water curing..	120	170	320
After 28 days water curing..	200	280	400
After 28 days water and air..	250	350	450
Tensile strength			
After 3 days water curing..	.....	.....	20
After 7 days water curing..	12	17	.....

*Values in kg./c.m.² to change to lb./in.² Multiply by 14.2.

The development of the German cement industry is best summarized in the tabulation above. Aside from this scientific, yet applied activity of the association, it has also rendered invaluable services in the development of silicate chemistry. The annual conventions have brought such inspiration for further research that the researches conducted by the association, or financially supported by it, cannot be reviewed here. However, it may be pointed out here that the association has maintained for the last 25 years an up-to-date, recently enlarged laboratory in which the products of the member companies are tested with respect to complying with standards and in which some purely scientific researches are conducted. The association also finances to a large extent the Cement Technical Institute of the Technical School of Berlin.

Four nations share in the credit for the importance commanded today by the portland cement industry: England, Germany, France and America. No nation can claim superiority in this respect. While the English were the creators of this industry by empirical methods, the French contributed such heads as LeChatelier and—in the early days—Vicat, and have discovered the high-alumina fused cements. Americans deserve the credit of the first scientific research on the constitution and hydration problems from modern viewpoints, and such names as Rankin, Shepherd, Klein and Bates will remain well remembered in this industry. Germany took the initiative in drawing up standards. Investigators such as Michaelis, Janecke, Nacken, Endell, Killig and Kuhl have contributed to enlarging our fundamental knowledge of cements.

If today many a problem has not been answered satisfactorily, we should receive an impetus for further research, further creative work in that of our forerunners. Much can as yet be achieved in this domain. In fact, it seems that no other field presents as much promise for research work as that of hydraulic cements. The better the cooperation of the different nations and the more systematic the efforts of the individual nations the sooner will be achieved the solution of all problems. Though all of us treasure our national property, we should do away with barriers in the field of science, which can flourish only on international ground. This conviction of the members of the German Portland Cement Manufacturers Association became manifest in resuming relations with their American colleagues, interrupted in 1914, and establishing the connections broken by the war.

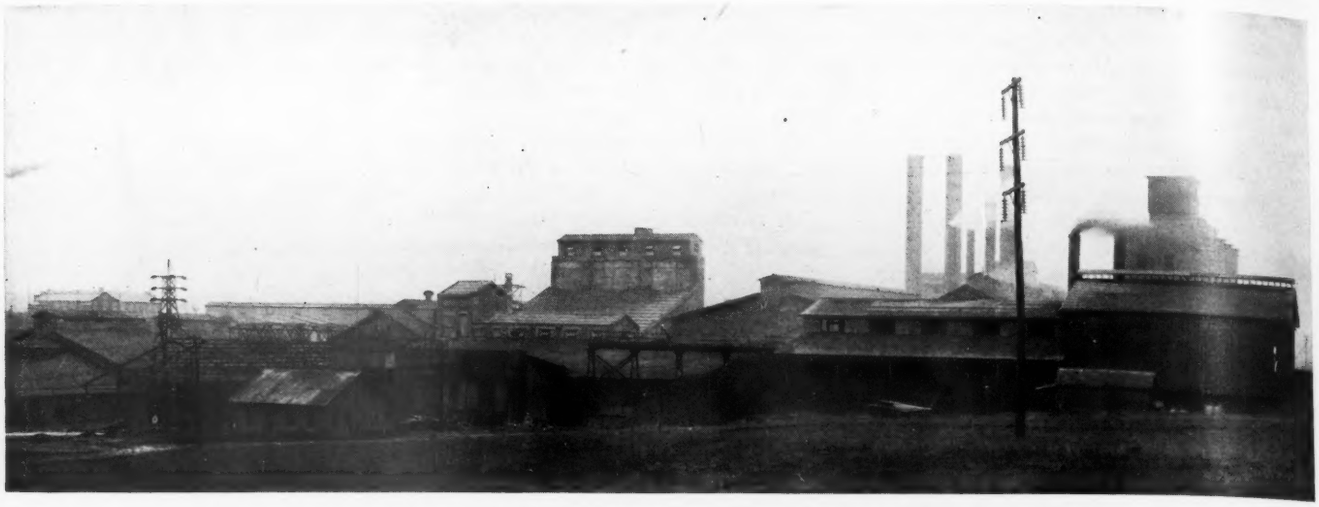
German Attempt to Corner Phosphate Slag

THE German steel works are endeavoring to corner the basic phosphate slag market, according to a report just received at the Department of Commerce from the American trade commissioner at Berlin, William T. Daugherty.

The full text of the report, as made public on April 26, follows:

German steel works are attempting to corner the local basic phosphate slag market. Led by "Vereinigte Stahlwerke A. G.," of Dusseldorf, a combination of phosphate slag producers, except A. G. Peiner Walwerk, Peine and Eisenwerk Ges. Maximilianshuette, Rosenberg, a sales syndicate has been in existence for some time. Even so, the two "outsiders" are committed to syndicate prices through their membership in the "Verein der Thomasphosphatmehlerzeuger" of Berlin.

Germany produced 1,300,000 tons of basic phosphate slag in 1926 and imported 700,000 tons, chiefly from France, Luxemburg and Belgium. Imported product is cheaper than German, with the result that efforts have been made by the syndicate to get control of this, but foreign producers have declined to enter the syndicate.



Recent view of the Coplay Cement Manufacturing Co. plant at West Coplay, Penn.

Application of Electricity in Cement Mills*

Some of the Advantages of Electric Drive for Cement Mills—Installation of Electrical Equipment—Recent Modern Installations

By W. E. North
Coplay Cement Manufacturing Co., Coplay, Penn.

NO single factor has contributed more to the present design and efficient operation of a modern cement mill than the application of electricity as its motive power.

The older cement plants were designed to operate on steam power, and since this necessitated the use of long line shafts to accommodate the numerous pulleys required to drive the many small manufacturing units then in use, these plants were practically built around an engine room. For this reason it was not possible to arrange the machinery used for the manufacture of cement in such a way as to insure maximum efficiency, nor could the elevating and conveying systems be installed so as to give the best flow of materials through the mill.

First Applications in Cement Mills

The first application of electric motors in cement mills was the use of d.-c. motors to drive auxiliary machinery requiring from 1 to 50 hp. It was, for example, most inconvenient to transmit power from the line shafts to elevator heads and overhead conveyors, and tests showed that from 50 to 90% of the power was lost in transmission, due to speed reductions usually accomplished with long chain and sprocket drives. Electric motors in such places proved an immediate success. They not only cut the transmission losses, but it was soon found possible to install an astonishing amount of connected load in motor horsepower, on a generator set of much less rated capacity. This was due to the fact that such drives are usually over-motored due to the high ratio of the maximum to the average power required by the individual motors. In one case known to the writer a total of 375 hp. in rated motor capacity was carried by generators rated at 150 kw. with only occasional interruptions in service due to opening of circuit breakers. This constituted such a radical and valuable change from the old line transmission practice that small generator units driven by special high-speed engines of from 100 to 500 hp. became a feature of every cement plant.

The electrification of the cement plants in the Lehigh Valley was started on a large scale when the Lehigh Navigation Electric Co. built its plant at Hauto and offered attractive power rates to the cement manufacturers, most of whom were operating with steam power plants that were either in poor condition or badly overloaded due to increased production demands. The work of changing over these mills consisted primarily of replacing the old line shaft drives by individual motors, and in most cases the general layout of the cement machinery was not changed to any great extent to get greater advantages of the use of electric motors. One of the plants installed 2200-volt and 220-volt induction motors, two plants used 550-volt induction motors, and one plant installed d.-c. motors.

Advantages of Electrification

The advantages of the electrification were realized very soon. At the Coplay Cement Manufacturing Co.'s plant the production was increased from 2600 bbl. per day to over 3000 bbl. per day without the addition of a single grinding unit, and since the meters on the various feeder circuits gave accurate records of power consumption, causes of trouble and faulty operation could be detected easily and the unit cost of manufacture was decreased.

The use of electrical machinery in a modern cement mill is necessary for the following reasons:

1. It makes it possible to design a plant to meet manufacturing conditions without being restricted by conditions imposed when using other forms of power.

2. Increasing cost of labor necessitates the use of labor-saving devices that are not practical except when driven by electric motors.

3. Saving in operating efficiency on account of not running idle machinery.

4. Necessity of keeping accurate daily cost data which is greatly aided by proper use of electric meters.

5. Greater flexibility in making repairs and adjustments to various parts of mill without interfering with other operations.

6. General trend toward larger manufacturing units.

One of the most important points to con-

*Reprinted from a report presented at the Regional Meeting of District No. 2 of the American Institute of Electrical Engineers, Bethlehem, Penn., April 21-23, 1927.

sider in the operation of a cement mill is the continuous operation of the various departments according to a prearranged schedule. The schedule of operation depends mostly upon local conditions, for, although it is necessary to run the kilns without shutdown, it is sometimes advisable to shut down certain departments over the week-ends. The quarrying and packing operations are in many cases discontinued on Sundays except during the periods of maximum shipping requirements.

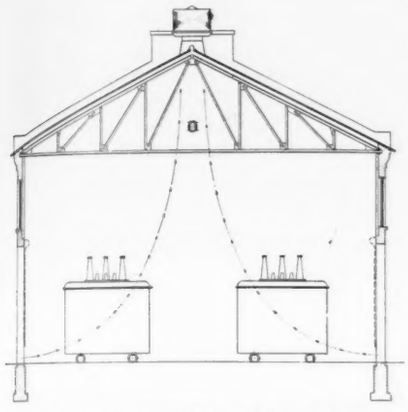


Fig. 1. Side elevation of transformer house at Coplay plant

The manufacturing departments of a dry process cement mill may be divided as follows:

Quarrying
Stone crushing and drying
Raw material grinding
Kilns
Coal crushing and grinding
Clinker grinding
Stocking and packing

It is seen easily that if a mill is designed with sufficient storage capacity between these departments, any department except the kilns and possibly the coal department may be shut down for repairs or other reasons without interfering with the other operations.

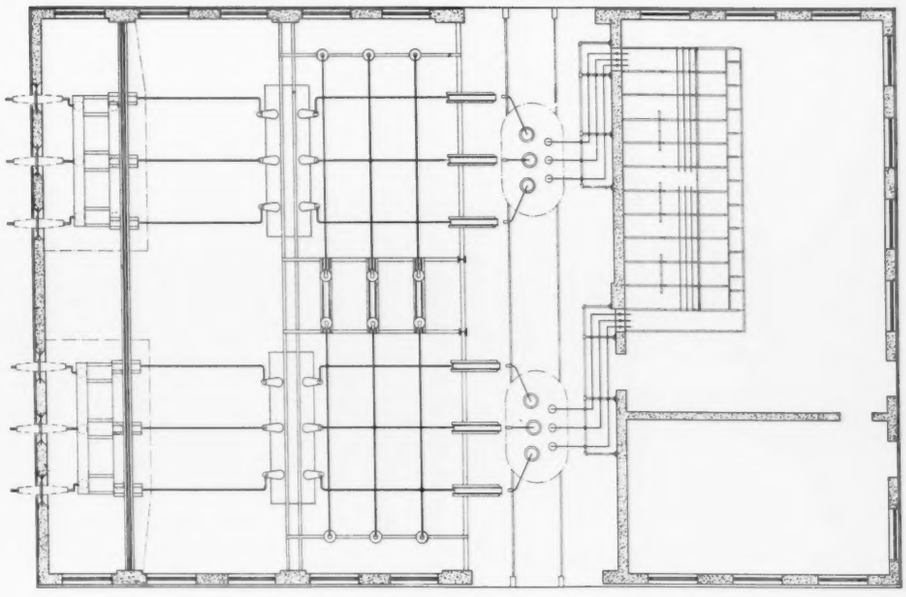


Fig. 2. Floor plan of transformer house showing position of electrical equipment

In a cement plant as outlined above, the electrical feeders should be so arranged as to supply one department only. If this rule is followed, repairs and adjustments to electrical apparatus and mill machinery can be made without interfering seriously with the operation of the mill. Such a feeder layout will not always meet with approval from an electrical viewpoint, since the power requirements of the various departments vary within wide limits, which means that the feeder panels and the distribution feeders will not be the same size, but the advantages gained from a manufacturing standpoint offset its disadvantages when considered simply as an electrical installation.

Flexibility of Operation

The advantage of flexibility of operation and the readiness with which repairs and adjustments may be made without interference have been explained. Another advantage is derived from a cost accounting standpoint. Compared with other industries, the ratio of the cost of power to the total value of the product manufactured is great, varying from 15 to 20% of the total cost, depending upon cost of power and efficiency of operation. To keep accurate and reliable account of the power costs is therefore of utmost importance, and if each manufacturing department is provided with its own feeder panel and necessary metering devices, accurate data as to power cost can be obtained daily. Since the power consumption is an indication of the efficiency of general operating conditions, other troubles are easily located and corrected before serious trouble is caused or costs increased. The safety factor is also improved, as any department not in operation can be cut off entirely from the feeder system.

The plans under way for the installation of new 60-cycle motors and for remodeling the mills of the Coplay Cement Manufacturing Co. at Coplay, Penn., are based on the above principles; that is, the electrical equipment simply supplies a means to drive the machinery and in no way influences the layout of the mill.

When the improvements in the mill are completed, sufficient storages will be supplied between all departments to allow for flexible and economical operation, and the electrical system has been installed so as to meet all of the requirements of operation of the mill.

The power for the electrical machinery is purchased from the Pennsylvania Power and Light Co., 60 cycles at 66,000 volts. Due to dusty conditions, and the insure as far as possible freedom from interruptions in power service, all of the 66,000-volt equipment was installed indoors, and the installation was designed to combine the greatest possible protection affording safe and continuous operation with the greatest simplicity of arrangement of equipment.

The transformer house is built of concrete with a cement tile roof supported on steel trusses. The concrete work was erected by the use of sliding forms. The pitched roof (6 in. per foot) with ventilators was used to secure the maximum amount of ventilation for the self-cooled transformers

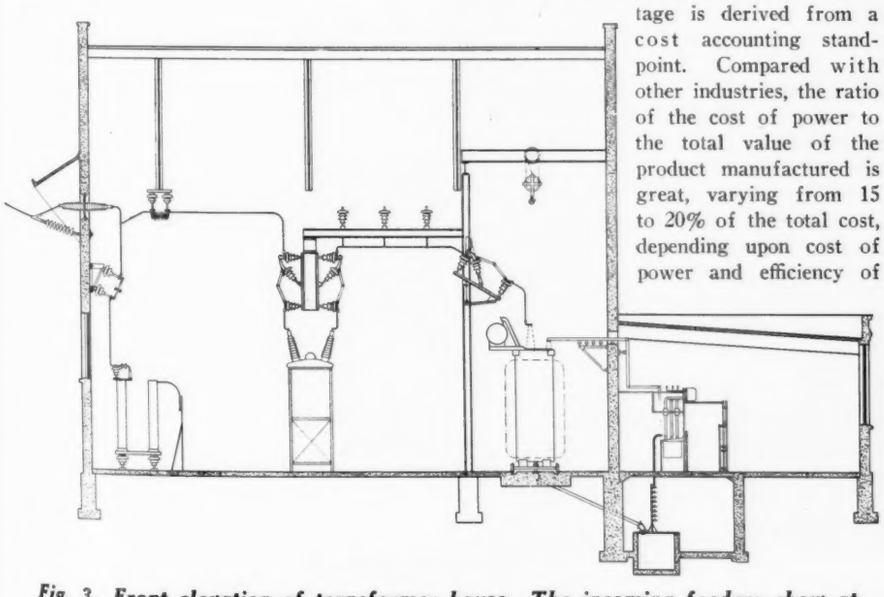


Fig. 3. Front elevation of transformer house. The incoming feeders show at the left and the tunnel under the switchboard at the lower right

without the use of fans. A tunnel extends through the building under the switchboard and contains cable racks, steam, water and compressed air service pipes and a concrete tank of sufficient capacity to hold the transformer oil in case it is necessary to empty the transformer tanks for any reason.

The building was erected and all of the equipment installed by the construction forces of the company.

The transformer house and arrangement of the electrical machinery is shown in Figs. 1, 2 and 3, and the schematic wiring diagram of the whole system in Fig. 4.

The incoming feeders enter the building through 110,000-volt wall entrance bushings

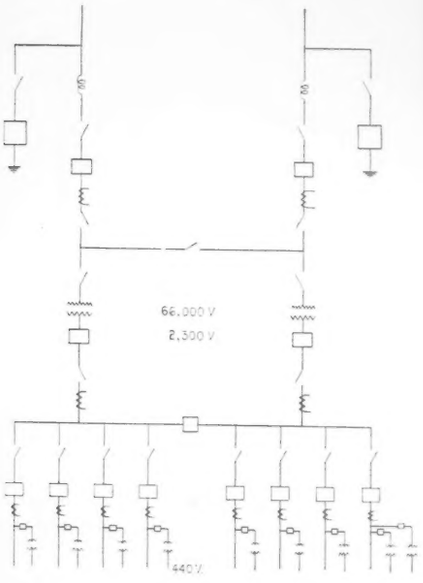


Fig. 4. Schematic wiring diagram of electrical system at Coplay cement mill

and the equipment is protected by oxide film lightning arresters. The main line oil circuit breakers have manually operated closing mechanism and are equipped with bushing type current transformers and have d-c. trip coils operated by induction type overload and reverse power relays.

The rupturing capacity of these switches is sufficient to interrupt the current due to a short circuit on any part of the system. The transformers are self-cooled, three-phase, 66,000-2200 volts, 5000-kv-a. capacity was four 2½% taps below 66,000 and are equipped with conservator tanks, thermometers and temperature indicators connected to coils in the windings. They are mounted on trucks and provision is made for a hoist beam for repairs.

The disconnecting switches between the oil circuit breakers and the bus are three-pole, gang-operated, and are mechanically interlocked so that it is impossible to operate them when the oil breaker is closed. The bus tie switch and the transformer bank switches are three-pole, gang-operated air break switches and are used for breaking the parallel operation and the magnetizing current of the transformers.

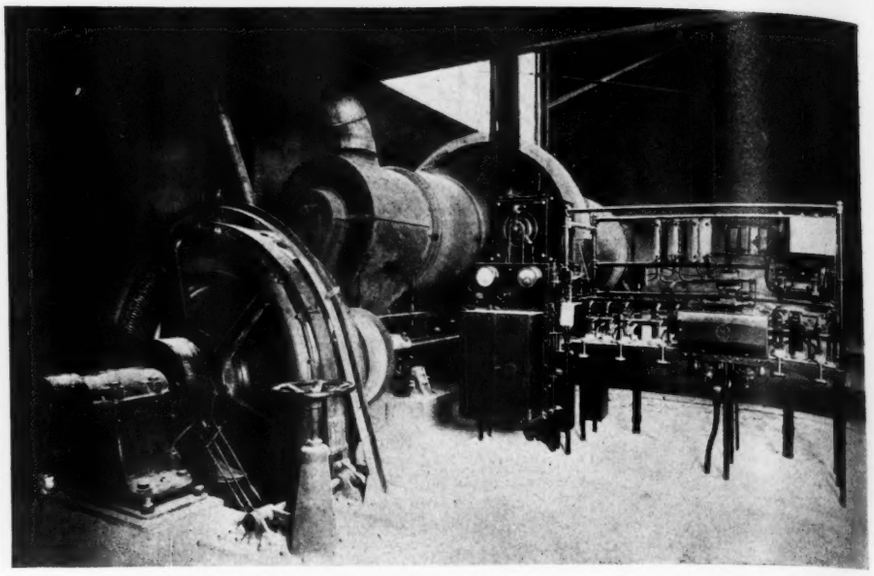


Fig. 5. A 600-hp., 3-phase, 2200-v. supersynchronous motor driving a tube mill at the Coplay plant

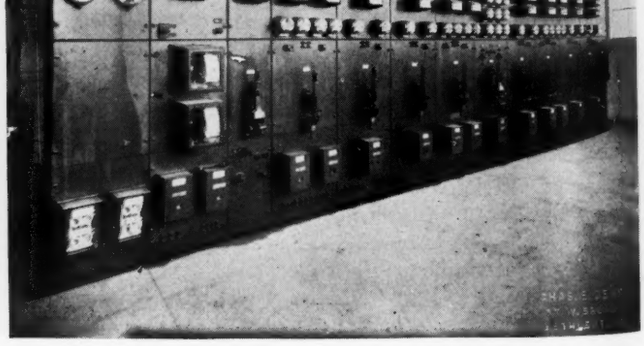
It will be noted, Figs. 2-4, that when operating on one transformer bank, one side of the station can be entirely disconnected, making safe repairs and adjustments possible.

The operating switchboard is in a separate room and consists of two transformer panels, two totalizing meter panels, feeder panels and a bus tie panel.

The bus tie switch is operated by an instantaneous overload relay and is used to sectionalize the bus in case of a dead short circuit on one of the feeders to reduce the rupturing capacity required by the feeder circuit breakers which have d-c. trip coils operated by inverse time limit relays. This combination operated successfully on two occasions when short circuits occurred on feeder cables during the construction period.

The totalizing panel is equipped with watt-hour meters, printometers, ammeters, voltmeter, curve drawing watt-meter, power-factor indicator, and wattless component in-

Self-cooled, three-phase transformer with air brake and main line oil switch



Distribution switchboard showing transformer, totalizing meter, feeder and bus tie panels

dicator to be used with watt-hour meter in computing the average power factor.

The feeder panels are equipped with oil circuit breakers, disconnecting switches, ammeter, watt-meter and watt-hour meters and with a complete set of testing studs on the front of the board for testing meters and relays.

New transformer station at the Coplay company's mill

All of the feeder circuits to the various departments are of armored lead covered varnish cambric insulated cable. The cables are run underground to the various departments and when located out of doors are buried about 3 ft. underground and spaced several inches apart. Boards are placed about 6 in. above the cables as a protection against injury by workmen making excavations.

Where the cables are located in buildings having concrete floors, the ditches in which the cables are laid are filled with earth and covered with a 2-in. concrete slab marked to show location of cables and to allow the concrete to be broken out easily, if necessary.

The starting equipment for the various motors connected to a feeder circuit is in most cases arranged in a group at the termination of the feeder. Since 440-volt motors are used for all sizes under 50 hp., small distribution transformers are connected to each feeder to take care of these motors.

The 2300-volt induction motors with few exceptions are controlled by manually operated starting compensators, and the 440-volt induction motors are controlled by magnetic starters except in case of variable-speed motors that have drum controllers and resistors. These starting switches are mounted on panels containing disconnecting switches, fuse blocks and testing jacks, all mounted in a single sheet steel box with safety catches.

The motors for the main grinding units are 600- and 200-hp. super-synchronous motors controlled by automatic panels; see Fig. 5. Where necessary, all motors driving different units of an elevating and conveying system serving a main grinding machine are interlocked to prevent choking of materials in case of stoppage of one of the units. All automatic starters are equipped with but one starting station, but many have several stop stations.

With the exception of gasoline locomotives operating in the quarries and on the railroad and two gasoline-engine-operated well drills used for prospecting at points distant from our feeder circuits, all power applications in the mill are motor driven.

The distribution of the motor load may be classified as follows:

DISTRIBUTION OF MOTOR LOAD

Pumps	260 hp.
Air compressors	170 hp.
Blowers	315 hp.
Well drills	50 hp.
Electric shovels (M-G set)	240 hp.
Quarry hoists	125 hp.
Bridge crane (M-G sets)	200 hp.
Elevators and conveyors	1055 hp.
Crushers	615 hp.
Dryers	110 hp.
Kilns	240 hp.
Grinding machinery	4950 hp.
Packing machinery	140 hp.
Machine tools and misc. applications	288 hp.
Total	8758 hp.

The types of motors used are as follows:

MOTOR TYPES

D-c. motors, 220-volt (Electric shovels, cranes, etc.)	374 hp.
Squirrel-cage induction motors, 440-volt	1886 hp.
Variable-speed induction motors, 440-volt	280 hp.
Squirrel-cage induction motors, 2300-volt	3100 hp.
Hoist duty induction motors, 2300-volt	125 hp.
Synchronous motors, 2300-volt	3340 hp.
Total	9105 hp.

With the exception of comparatively few motors with characteristics suitable for the operation of electric shovels, cranes and other labor-saving machinery, most of the motors used in the cement industry are of standard design and construction, and since the general practice in the installation of this equipment is to make the starting operation as automatic as practicable, specialized mechanics are not required for the operation of the motors and few skilled men are required for their maintenance.

An installation such as described above would be expected to operate 24 hr. a day for 360 days per year, and would have a yearly load factor (ratio of average demand to maximum demand) of 80% and a monthly load factor of 88% with an average power factor of 90%, making it a desirable load from a power generating standpoint.

Modern Tendencies in Cement Mill Design

The tendency in cement mill work is toward larger grinding units and the most efficient electrical apparatus obtainable, standardization in sizes and speeds of the general purpose motors, and distribution of the motor loads into circuits, so as to best meet the manufacturing requirements of the mill.

The recent development of synchronous motors of high starting torque, with either mechanical and magnetic clutches, has caused the installation of more direct-connected units, eliminating many expensive belts and pulleys and resulting in great saving in space and in efficiency and safety of operation.

In many instances, ball and roller bearings have been used in extremely dusty places with good results, but a modern cement mill can be made to be so free from dust that when proper attention is paid to the condition of the equipment, motors with standard babbited bearings can be operated with as little trouble as when installed on similar machinery in other industries.

The use of belts and chains on countershafts for speed reduction necessary to drive elevators and conveyors has been almost universally replaced by the use of gear reduction units direct connected to motors through flexible couplings mounted on common bases. Reducers of these types can be built for speed reductions ranging from 4 to 1 up to 8000 to 1 when power does not exceed 500 hp., and therefore cover the entire range of cement-making machinery except in case of the larger grinding units. Rock crushers and heavy machinery subject to severe shock are still usually belt driven to provide flexibility and reduce the strains on the motor bearings and coils.

In addition to the above described motor applications, electricity is used in cement mills for magnetic separators, rivet heaters, arc and spot welders, pyrometers and various other applications of electricity, all of which have become most satisfactory features in operating cement plants, and as is the case in other industries, electric power has become one of the greatest factors in production, and from raw material to the finished product the responsibility of uninterrupted manufacture rests primarily upon the electric motor.

Production of Potash in 1926

POTASH produced in the United States in 1926 amounted to 46,324 short tons of crude potash salts containing 23,366 short tons of potash (K_2O), according to the United States Bureau of Mines, Department of Commerce. Sales by producers amounted to 51,369 tons of crude potash containing 25,060 tons of K_2O. The potash materials of domestic origin, sold by producers in 1926, were valued at $1,083,064 f. o. b. plants. About 26,000 tons of crude potash with an available content of 9000 tons of K_2O, remained in producers' stocks December 31, 1926. The production was chiefly from natural brines in California and distillery residue from molasses in Maryland.

Blast Furnace Slag as a Road Material*

Allegheny County (Pennsylvania) Engineer Compares Slag with Crushed Stone and Gravel

By P. J. Freeman

Chief Engineer, Bureau of Tests and Specifications,
Allegheny Department of Public Works, Pittsburgh, Penn.

DURING 1926 approximately 170,000,000 bbl. of portland cement was produced in the United States, which means that about 100,000,000 cu. yd. of concrete was placed in this country. About 25% of this concrete was used in roads, and an equal amount poured in structures. The remainder was used on farms, for concrete blocks, etc. The use of concrete is steadily increasing and we can look forward to a still greater development. Such being the case, the engineer begins to be concerned about obtaining better and better aggregate to mix with the improved cements being developed.

It seems well established that, in highway construction, some aggregates will suffer more cracks in the road than will others. Some tend to form pockets, due to containing soft particles, while another type of aggregate sometimes fails structurally and causes the concrete to disintegrate. We have tests which tell us something about the quality of aggregates, but we are still badly in need of more accurate tests for determining their durability.

Concrete contractors pay little attention to the quality of the aggregates going into their work, but the engineers for large construction jobs are beginning to pay a great deal of attention to these things. The state highway departments are teaching the counties—the counties are teaching the townships and boroughs—and it is only a matter of time until such methods will be adopted by most contractors. The driving force back of all these studies and investigations is the fact that a large amount of the concrete placed has to be either replaced or repaired.

Causes of Disintegration of Concrete

Most of the disintegration is no doubt due to improper methods of mixing and placing. But after we have gone over the known causes for concrete failures, both in roads and in structures, we finally come up against the fact that in some of these jobs, after every attention was paid to the details of construction, the work was unsatisfactory.

As chairman of a sub-committee of the American Society for Testing Materials, on the "Conditions Affecting the Durability of Concrete," my attention has been called to many million dollars' worth of concrete which is becoming unsatisfactory, and other jobs which have been total failures. Some of these failures were undoubtedly due to the use of an unsound aggregate, and great effort is being put forth to devise suitable tests to determine this quality. These failures, found throughout the length and breadth of the country, are most common in the colder sections.

Gravel and Limestone as Aggregates

Around Pittsburgh we have available gravel dredged from the rivers, limestone shipped from adjoining counties, and blast furnace hard slag produced in the district. Gravel is produced in large quantities, as it is necessary to dredge about two tons of gravel to obtain one ton of sand. This makes gravel cheaper than it would otherwise be. Gravel specifications are rather indefinite as to quality requirements. Particular stress is laid on the grading, and Allegheny county requires the abrasion loss not to exceed 12%.

Gravel coming from a variable source is liable to lack uniformity as to quality of the individual material and sometimes as to grading. Crushed gravel is more uniform than run-of-bank or dredged gravel. A particular advantage possessed by gravel is its workability. It is easier to place gravel concrete in mass construction than any other aggregate, but the engineer always has difficulty in obtaining a uniform product.

Limestone is obtained directly from the quarries. Before acceptance it is customary to investigate the ledges and to test the material for abrasion and toughness. The limestone is further subject to a soundness test believed to indicate its ability to resist the action of freezing and thawing.

This soundness test is important, and it is sometimes found necessary to reject the output of an entire quarry because the stone is unsound. Where such stone is used in concrete it will gradually rot away and cause disintegration. This unsoundness can be detected by careful inspection and testing at the source, but it must be properly handled or bad concrete will result. Limestone makes a satisfactory aggregate, particularly for highway construction.

Tests of Slag for Use in Concrete

About 10 years ago several slag producing companies inaugurated a series of tests to determine the strength of various concretes, particularly slag. Aggregates were obtained from 15 widely separated sources: granite from Georgia, trap-rock from Pennsylvania, local gravel, and blast furnace hard slag from several furnaces. These tests definitely indicated that the crushing strength of slag concrete is equal to that made by other material. But the tests were made on laboratory cylinders, and refer only to the compressive strength of the concrete. They might not necessarily apply to a thin slab like the section of a road, which must resist flexure and abrasion. We need more information along these lines. A series of tests is being inaugurated to make a careful study of this property as possessed by gravel, stone and slag concretes.

In the tests started 10 years ago, samples of steel were embedded in specimens; at the end of 5 years no rusting had taken place. In my opinion we do not need to worry about rusting being caused by the use of slag concrete any more than by any other aggregate.

Uniform Quality a Prime Essential

Slag as ordinarily produced lacks the uniformity in quality obtained from limestone. For that reason the average engineer prefers limestone over any other material for concrete road construction. In some localities gravel is so cheap that the engineer cannot refuse to use it, and good, uniform gravel will produce good concrete. But if we had an aggregate made under a quality specification as portland cement is now being made, the engineer would feel some hope of producing concrete for permanence.

The future holds great possibilities for the development of manufactured aggregate from blast furnace slag. To be sure, we will have to control the flux stones, to produce a slag which will not disintegrate with age. It will be necessary to use care in making the slag, so that it will not contain foreign matter, such as brick and other rubbish. Slag as now produced makes a satisfactory concrete, but it will be necessary to improve its general characteristics greatly, if it is to have a demand on a par with gravel and stone. The average engineer strenuously objects to placing light—so-called "honeycomb"—slag into his concrete. The use of slag will be retarded until this light material has been eliminated.

One thing which has made slag desirable in this district is the fact that the producers have used care in grading. Engineers particularly desired material to comply with specifications as to grading, and some will

*Abstract of paper read at Eastern States Blast Furnace and Coke Oven Association Meeting, Pittsburgh, March 4, in *Iron Age*.

overlook the light material if the slag is well graded. We have built some satisfactory roads with blast furnace hard slag. If it were possible to obtain a slag having the same uniform quality as limestone, it would no doubt readily obtain the same following among concrete producers as limestone, particularly for road construction, where the highest type of aggregate must be used.

Only One Yard in Fifty Made from Slag

Of the 100,000,000 cu. yd. of concrete placed in this country last year, I presume that less than 2% was made with blast furnace slag. I would estimate that more than one-third of this concrete was placed within shipping distance of blast furnace slag, so that there should be an opportunity for considerable expansion in the production of blast furnace hard slag as a by-product, and not as a waste product.

Under the conditions which would produce the maximum use of blast furnace slag for concrete aggregates, a manufactured aggregate would be had with a known chemical composition. It would be durable under the action of the elements, a material free from organic matter, one which has a splendid surface for bonding to the mortar and one which is crushed to a uniform grading, free from dust. It will be up to producers of blast furnace slag to see that future developments tend toward uniformity and durability.

Blast Furnace Slag as a By-Product of Value

By W. E. DONALDSON
Special Agent, Slag Department, Carnegie Steel Co., Pittsburgh

HOW to dispose of blast furnace slag with the least possible cost to the producer, or how to prepare it so as to dispose of it at a reduced cost compared with that of wasting it to the railroads or depositing it on expensive land, has been the concern of blast furnace operators for many years. Pig iron now produced in the United States annually is about 40,000,000 tons. It is closely approximate to estimate the amount of blast furnace slag produced annually at 20,000,000 tons.

This tonnage must be taken away from the furnaces currently to maintain operations. Its removal and disposition constitute an important item in the cost of producing iron. A reduction in this item is possible only when and if the slag quality is improved so that it will pass engineering requirements and specifications on a par with other aggregates. A market is not immediately available for all of the blast furnace slag produced. But when properly produced, a wider field can be created for its use as an aggregate in cement concrete and in bituminous concrete. If the lighter grades are eliminated, it makes the finest railroad ballast obtainable.

In the United States east of the Mississippi River there is annually placed approximately 45,000,000 cu. yd. of concrete. Of this amount only some 2,000,000 cu. yd. is made with blast furnace slag as the aggregate, notwithstanding the fact that in this area slag is available within easy shipping distance from the furnaces.

Besides the usefulness of slag for ballast and bituminous concrete roads, traffic-bound roads offer a promising outlet. The latter are constructed by counties and townships by doing a small amount of grading and placing upon the road concrete size slag mixed with 25% of slag sand. These roads are rolled and scarified alternately for about three weeks, until a uniform set has taken place. This type offers a good road at approximately $5,000 a mile, which is a boon to poorer communities unable to have a costlier type of highway.

Magnesia Content Important

Unfortunately, many producers of slag have the idea that all blast furnace slag should be suitable for the market after passing through the crushing and screening plant. Such is not the case. Slags from blast furnaces using a limestone containing at least 6% magnesia are suitable for the market at present. But when limestone such as is produced in the Mahoning and Shenango valleys and points east of Pittsburgh, as well as some limestone from the Lake regions, is used, without the addition of stone to bring up the magnesia content to 5 or 6%, the slag slakes down in the dump or pit.

Slag as an aggregate in concrete came into use about 1895 in the eastern part of Pennsylvania and at Johnstown. It came into more general use, particularly at blast furnaces and steel plants, between 1903 and 1906 in the Pittsburgh district, at Pottsville, Reading and Lebanon, Penn.; Youngstown, Cleveland and Lorain, Ohio; Mayville, Wis., Chicago, and later at Gary, Ind. At one or another of these plants it has been used in concrete in about every type of construction for which concrete can be used—heavy and light mass foundations, including those of blast furnaces, coke ovens, stacks (several of which were 290 ft. high), water tanks, dams, sewage treatment plants.

First Tentative Specifications

About ten years ago the first effort toward establishing of tentative standard specifications for blast furnace slag was made by the American Society for Testing Materials, the United States Bureau of Standards, the United States Bureau of Public Roads, the American Society of Civil Engineers, and the American Railway Engineers' Association. Recognition in all of these societies has been obtained for it under certain definite specifications, one of which is that the weight of crushed slag shall not be less than 70 or 75 lb. per cu. ft.

While in some states specifications vary slightly, as a rule there is an allowable loss of 12 per cent on slag when submitted to the abrasion test, as compared with an allowable loss on stone of 5 or 6 per cent. These requirements were made by the societies in favor of slag, due to the fact that it has a more angular fracture than stone, leaving thin, sharp edges, which, when submitted to the abrasion test, show a much higher loss than limestone. But when placed in concrete a slag of uniform density has shown, under the wear tests of the United States Bureau of Public Roads, as good resistance to wear as the best aggregates.

Slag as a Ballast Material

Due to the presence of a considerable amount of honeycomb slag, it has not been considered so desirable by railroad engineers for ballast as trap rock or hard limestone. The common complaint is that it breaks up under the action of the tamping pick to a much larger extent than good limestone. But no field offers such wide possibilities for the use of blast furnace slag as railroad ballast. During 1926 railroads in New York, Ohio, Pennsylvania, Kentucky and West Virginia used a total of over 1,000,000 tons of crushed and screened blast furnace slag for ballast, and 275,000 tons in the Alabama district. The Southern roads in territory adjacent to Birmingham used also a total of 1,720,000 tons of rough bank slag for sub-ballast purposes.

Even with this, however, the slag used for ballast in 1926 was almost negligible when compared with the amount of stone and gravel used for ballasting by the large trunk line railroads, the greatest source of whose income is hauling raw materials away from them. If a grade of blast furnace slag were produced comparable to that of limestone, the railroads could not well refrain from using it as a ballast material within reasonable shipping distances from points of production, provided, of course, the prices are not above those for limestone.

The Carnegie Steel Co. made a series of experiments several years ago to determine what character of material could be obtained by more rapid chilling and cooling of the molten slag than is accomplished on the large slag dump. The slag resulting was extremely dense, weighing over 100 lb. per cu. ft., as compared with 70 to 75 lb. with the ordinary slow cooling process by depositing on the dump. This material was approved by the railroads for ballast. However, due to various reasons, especially to the cramped conditions surrounding one or two of the plants at which experiments were made, production in commercial quantities has not been possible.

Much interest has been taken in experiments made at Sharpsville, Penn., and later at Youngstown, Ohio. The slag produced at the latter point has shown unusual possibilities, especially for railroad ballast, weighing slightly over 100 lb. per cu. ft. It is very dense, with an absorption of less than 1 per cent and an abrasion loss averaging about 3 per cent, as compared with an allowable stone abrasion loss of 5 or 6 per cent. This shows clearly that, in the ordinary furnace practices of today, slag

having 6 per cent or more of magnesia in it is commercially possible.

As a Manufactured Product, Slag Quality Is Under Control

Mr. Freeman stated that there was approximately 100,000,000 cu. yd. of concrete placed during 1926 in the United States. Approximately 2 per cent, or 2,000,000 cu. yd., was made of blast furnace slag. Of course much of the yardage of concrete was beyond the shipping distance of blast furnace slag. However, in the territory within easy shipping distance, in which 45,000,000 cu. yd. of concrete was placed, only 2,000,000 cu. yd. was made with blast furnace slag. Assuming that all such slag produced in 1926 had entered into concrete, there still would have remained approximately 25,000,000 cu. yd. of concrete to be made with stone and gravel.

Blast furnace slag is not the only mineral aggregate to feel the tightening up of specifications. Many engineers are deeply concerned as to where they will find materials with which to produce a permanent concrete. Recently an eminent concrete authority said that blast furnace slag, properly made and prepared, more nearly approaches the ideal than any of the natural mineral aggregates, because it is manufactured material and can be controlled, which is not the case with natural mineral aggregates.

If producers realize that slag is a valuable by-product and not a waste material, it will naturally receive more care and attention in its handling. Stated another way, if the producer can be prevailed upon to improve production methods, slag possibilities may be readily capitalized.

Crushed Stone Producer Recovers Damages for Breach of Contract

QUITE frequently litigation results between the buyer and seller of rock products. The case of Bennett vs. Dayton, 135 S. E. 13, decided within the past few months, contains some very valuable information on this subject.

The facts of the case are that a contract was entered into by L. L. Bennett and R. S. Dayton, in part as follows:

"The said parties of the first part (Bennett) are to furnish crushed limestone to the second (Dayton) in at least the amount of 4,000 net tons f.o.b. Faulknew, at $2.75 per net ton, for the wearing coat of the Elkins-Beverly project No. 78 class A Federal aid road, the said limestone to be so crushed or manufactured to meet the requirements of the state specifications for bituminous macadam road.

"The said parties of the first part (Bennett) to begin shipment of said stone in the month of June, when the said second party (Dayton) gives notice so to do, and to continue shipping said stone at the rate of one carload per day until the said 4,000 tons are furnished.

"It is further understood that the said stone shall be shipped in drop bottom hoppers, but, in case of shortage of cars, breakdowns or other unavoidable accidents which may prevent the said first parties (Bennett) from shipping said stone as rapidly as heretofore agreed upon, the said first parties (Bennett) shall not be liable for damages to the said parties of the second part—(Dayton) shall have the right to purchase said stone from elsewhere until the said (Bennett) can resume shipment."

However, absolute notice to begin shipment was not given until July. After about 1800 tons of the stone had been shipped and accepted by Dayton, the latter wrote the following letter (dated Oct. 5th) to Bennett, the seller:

"Please stop all shipments of all limestone, except two carloads of chips, to Elkins, as we need them at once. This is not due to bad stone, but to the fact that owing to the excessive freight rates and bad weather we are not using any more stone this year. We have a tank of tarvia here now, and as soon as we get it on will close down for this fall."

Bennett shipped seven cars after receiving this letter. The two cars which contained the chips were accepted by defendants. The other five cars were rejected. On October 11 Dayton sent the following letter:

"We understand that you are still ordering cars shipped to Beverly, and this is to notify you that all stone will be refused, except the two cars we agreed verbally to unload."

The five rejected cars were finally sold to the railroad company at a loss.

On March 30, Bennett notified Dayton that he was ready to fulfill the contract, but the latter did not respond.

Bennett sued Dayton for $2,531.37 damages. Dayton claimed that a considerable portion of the stone was not equal to specifications, although accepted and paid for.

The higher court held that when Dayton accepted the poor quality stone he forfeited his rights to refuse to fulfill the contract by reason of inferior quality of the stone.

The case was carried through the courts with first one litigant having a favorable verdict and then the other, until the higher court held that Bennett was entitled to recover $2,531.57 damages, in view of the various losses sustained, an important one being that he was compelled to sell the remainder of the 4,000 tons of stone at a much lower price than was agreed to be paid by Dayton.

International First-Aid and Mine-Rescue Contest Dates Announced

THE dates for the sixth International First-Aid and Mine-Rescue Contest, recently announced as to be held in Pittsburgh, Penn., have been fixed for the three days, August 30 and 31 and September 1. The first-aid contests, in which teams from coal and metal mines, quarries and oil-producing and refining companies from numerous states will compete, will be held at Duquesne Gardens. The mine-rescue meeting, which will also be participated in by teams from widely-scattered mining communities, will be held on the campus of Carnegie Institute of Technology. The contest will be given under the auspices of the United States Bureau of Mines, Department of Commerce, in cooperation with the Pittsburgh Chamber of Commerce.

Various prizes will be awarded the teams which, in the opinion of the judges, prove themselves most efficient in first-aid and mine-rescue methods. Each first-aid team will be composed of six men, including a "patient." Each team will be required to perform three or more definite problems in first aid, calling for the treatment of injuries and the proper handling of the patient. The patient, assumed to be suffering from electrical shock, arterial bleeding, broken bones or other injury, will be given the first-aid treatment prescribed in the manual of the United States Bureau of Mines.

The competing mine-rescue teams will be composed of five men provided with oxygen breathing apparatus and other necessary equipment used by rescue crews in coal and metal mines. The teams will be required to work out in a specially prepared smoke room a practical problem such as is likely to be encountered in underground rescue operations.

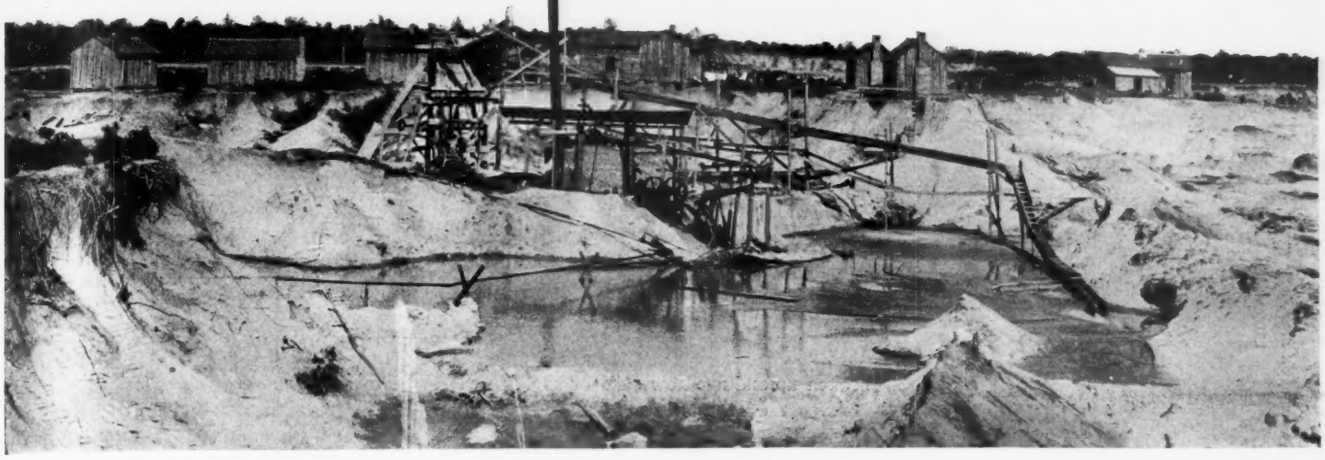
The International First-Aid and Mine-Rescue Contests are held each year under the auspices of the Bureau of Mines, with the co-operation of the National Safety Council, the American National Red Cross and various mine operators' associations and miners' organizations. Employes of mines, quarries and metallurgical plants and workers in the oil and gas industry are eligible to participate in the contest. More than 200,000 workers in the different mineral industries have been trained in first-aid or mine-rescue methods by the Bureau of Mines. A feature of the meet will be the awarding of the Congressional medal given annually to the teams of miners adjudged most thoroughly skilled in first-aid and mine-rescue methods.

The Bureau of Mines has made the First-Aid and Mine Rescue Contest the occasion for calling in from the field all of its mine-safety instructors for the purpose of giving them a brief, intensive course of instruction in the latest mine safety and accident prevention methods.

Sand and Gravel Production in Georgia

Bank Operations Predominate

By Edmund Shaw
Editor, Rock Products



Morac Sand Co.'s plant at Junction City, Ga.

GEORGIA stands rather high as a mineral producing state and it is said practically everything mined or quarried elsewhere has been produced in the state at one time or another. In rock products there is a considerable production of cement, lime and limestone products along with barytes, feldspar, ochre and the other rock products of lesser tonnage. Knowing this, it is surprising to learn that the state imports a large part—if not the larger part—of the concrete aggregate, railroad ballast and road material it uses.

I was driven down to A. P. Burke's sand plant at Gaillard, which is 90 miles south of Atlanta. Most of the way was over a concrete road paralleling the railroad track. The track was ballasted with slag all the way, and I was told that the coarse aggregate in the concrete was mainly of Birmingham slag and Montgomery gravel. Some locally produced crushed granite had been used, however.

Small Crushed Stone Production

Of course there is some production of crushed stone in the state. At Rockmont and Cartersville, limestone is crushed, and granite comes from Stone Mountain, Lithonia, Stockbridge, Macon and points near Augusta. The granite from Stone Mountain and Lithonia is in the nature of a by-product. It is mainly the waste of the well-known quarries at those points making curbing and paving blocks. The other granite quarries are worked for crushed stone only. Gravel is produced at two points, Columbus and Fort Gains—that is, washed gravel. Clay gravel for unpaved roads is produced in considerable quantities near Warrenton. But J. H. Neil, the chief highway engineer, told me that there was no thought that the state could produce anything like the material needed for its present road program. Most of the material will have to be imported.

Large Road Program

The program this year is larger than former years, for it is planned to build 170 miles of concrete roads and 125 miles of asphalt road of all types and to spend between $8,000,000 and $10,000,000. Some unsurfaced road will be built, clay gravel and clay macadam, and these roads, will be constructed so they can be used later as bases for concrete or for some type of bituminous road. The state is experimenting with some unusual types of bituminous paving, one, known as the Finrock road, which has a thickened edge to prevent the usual breaking off at the edges. There are three types of surface-treated roads that go on clay macadam bases using from 100 to 170 lb. of crushed stone per square yard, classed as light, medium and heavy paving.

One curious road material which I have not heard of before is an iron gravel made up of pebbles of iron oxide, presumably concretions, such as are often found in clays. These pebbles lie in beds 8 in. to 18 in. in thickness, with little or no overburden. A bituminous type of road has been laid south of Macon, on a main highway to Florida, using these iron pebbles, and it is standing heavy traffic very well. The cost was only $7,000 per mile.

These iron pebbles are found in the coastal plain in which three-fifths of the state is located. Geologically, this part of Georgia is connected with Florida, that is, there are the same exposures of Ocala limestone and the Alum Bluff sandy formation, which extends down through the center of Florida, begins in Georgia. As in Florida, road building material and aggregates of the common type are not found in the coastal plain, but the same new materials that have been used in Florida are being tried in Georgia. At Ainslie a company has begun to quarry and crush the Ocala limestone for road material, and the product is said to have an even higher cementing value than that quarried at Ocala. Dr. R. S. MacCallie, the state geologist, is of the opinion that the "Altamaha grit," a kind of soft sandstone, in which kaolin is the cementing material, had some possibilities for road making. Some samples he showed me were like lumps of soft gravel cemented together with white clay.

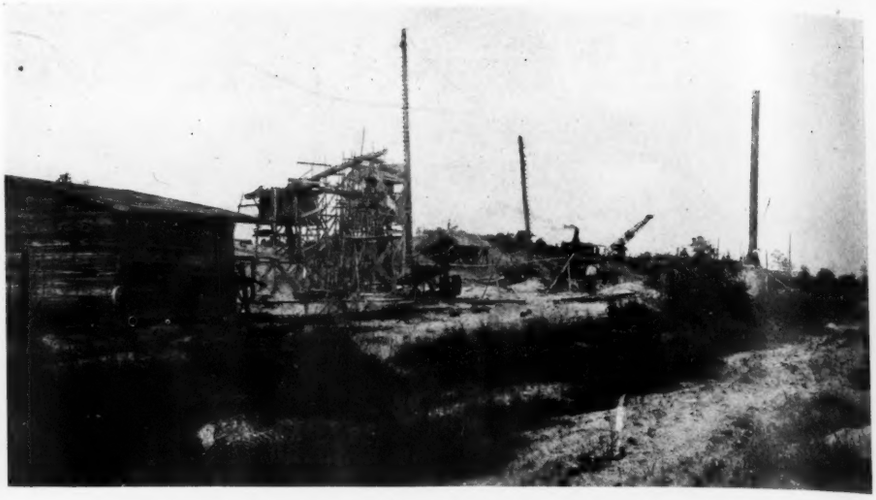
Looking for Gravel Deposits

Since there is probably to be a considerable building of highways in Georgia in the near future, gravel is being sought. Not only the producers of sand, who would like to produce gravel as well, but the industrial geologists of the railroad and members of the highway department are looking for it. It exists, of course. The old crystalline rocks, now so largely weathered to soil, contained the same quartz veins that made the gravels found on the edge of the Piedmont plateau in other states. But in Georgia such deposits have been found too far from a railroad or else they did not have the depth and area to be profitably worked. It hardly pays to put up a washing plant for less than a million tons, and this tonnage should be fairly easy to recover. One of the Brown brothers, who are very large producers of sand near Howard, Ga., told me the best deposit of gravel he had been able to find contained about 500,000 tons and it was spread over a 50-acre field with an average depth of something like 5 ft. He did not think it worth developing, especially as it was two miles or so from a railroad. At the highway department it was learned that a promising deposit had been recently found near Dublin, Ga.

The gravel which came through the disintegration of the older rocks appears to have been deposited at a fairly high elevation on the edge of the Piedmont plateau. These deposits were afterward cut through by deep ravines and the gravel may lie at some distance and perhaps be buried deeply under sand and clay from later erosion. We noticed something to confirm this theory while driving over the Columbus highway near Butler. The road passed over some high hills and, on top of the highest, gravel was found in considerable quantity. None of it was of very good quality, for there were

Gravel exposed in road-cut near Butler, Ga.

many pebbles of schist and rotten granite mixed with the quartz pebbles, at least in the deposit of greatest area, which was the only one that tempted us to get out of the car to examine. Possibly where this gravel has been carried farther by the washing down of the hills, the soft pebbles have been broken up and are now sand or soil.



Southern Sand Co.'s operation near Junction City, Ga.

A part of this trip was made with Dr. Poole Maynard, industrial geologist of the A. B. and C. railway, who is much interested in the possibilities of finding a good gravel deposit on the line. It is his opinion that it might be worth while, in view of the coming needs for highway material, to prospect for gravel systematically, which would, of course, be a job for a field geologist. In the meantime it would seem a good opportunity for the crushed stone men to prepare for increased production, as some of them are reported to be doing.

I went to Junction City and Howard, Ga., with Dr. Maynard to see the sand operations carried on near these towns, which are much larger than I had expected to find. All are now bank operations, with very little washing, although all of them have washing plants or what were once washing plants. The greater part of the production is shipped for fertilizer filler, pig bed sand (used by the Birmingham furnaces) and for the many other uses to which fine sand is put, provided it can be bought cheaply enough.

The largest of these operations is that of the Brown brothers and is known as the Central of Georgia Sand Co. The bank they have been working near Howard has been cut through for nearly a mile, and I would judge it to average 40 ft. in height. The sand is very clean and resembles greatly the dune sand found around Lake Michigan. It is recovered in the same way, by loading on cars with a locomotive crane. This Central of Georgia pit has a small washing plant consisting of four Lewistown sand washers set in parallel. It produces two cars daily of a special core sand which has to be washed and classified to meet specifications. This washing plant is owned by the Kirkpatrick Sand and Cement Co., the Central company operating it for them. The bank operations used to belong to the Kirkpatrick company, who sold it to Brown Bros., retaining the core sand business.

Brown Bros. Building New Plant

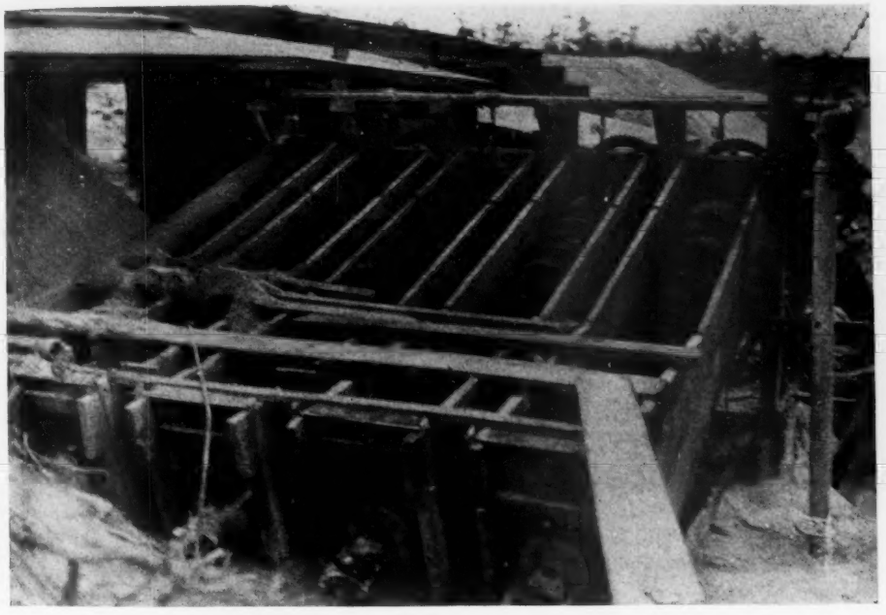
Brown Bros. are starting a new operation on the A. B. and C. railway near Junction City, which will be a modern plant in every respect. The power house and a pump house had just been completed when the site was visited recently. A dam of some length had been thrown across a creek and this impounded sufficient water for the hydraulic operation to be carried on.

Atlanta Sand and Supply Co.'s deposit at Gaillard, Ga.

Washing sand into cars at the Gaillard, Ga., plant

Loading bank sand at Central of Georgia plant. The bank is nearly a mile long

Core sand washing plant, Central of Georgia operation, Howard, Ga.



Sand washers in Central of Georgia plant

The power house has a 120-hp. Fairbanks-Morse full-Diesel engine direct connected to a Fairbanks-Morse generator. Power will be sent to pumps at the pit, which is about 700 ft. away. The scheme will be to "gun" the bank and then pump the material to the washing plant, which will consist of a Dorr washer and later, perhaps, Dorr classifiers. The pump house, which was completed, contained a 6-in. Georgia Iron Works pump and a 40-hp. Fairbanks-Morse motor.

Both fine sand and concrete sand are to be produced, but not from the same bank material. The concrete sand has been found on the other side of the dam from the fine sand. It lies rather deep and borings have been made to determine something of its depth and extent. It is a fairly coarse sand with a fineness modulus judged to be about 3.00, and it would require very little washing to prepare it for the market.

There are four of these Brown brothers, W. M. M., J. H., R. L., and L. B. They are energetic and have built up a good-sized business in sand. Two of them are now constructing the new plant, while the others attend to the work at the Central of Georgia plant at Howard.

The other shippers at Junction City are J. L. Downs, the Morac Sand Co., the Southern Sand Co., and the W. C. Harckey Sand Co. A hurried visit was paid to each of these operations and all were found loading bank sand with locomotive cranes. Washed sand production has not been very successful. The concrete sand to be washed lies under the fine sand and there are layers of clay in it. These interfere both with digging the material and washing it, and the loading of fine sand which requires no washing is hence more profitable.

These banks of fine sand looked so much like the familiar dunes about Lake Michigan that I asked Dr. Maynard if they were not formed in the same way. He said he had not yet been able to make up his mind whether the winds or the waters were responsible for them.

A. P. Burke's Plant at Gaillard

The only other sand operation I visited was that of the Atlanta Sand and Supply Co. at Gaillard. Everyone in the National Sand and Gravel Association knows A. P. Burke, the manager, from his long service on the board of directors and his regular

Brown Bros.' new operation, Junction City, Ga., showing pump house and dam

attendance at conventions. For a number of years he has been running two small plants at Gaillard "gunning" the bank and then pumping the sand and water directly into railway cars. This is not such a crude operation as it sounds, described in that way, for he has worked out ways of collecting the sand and running off the overflow that makes a car into a fairly efficient settler. However, this method is to take a secondary place shortly, for he is building a dredge

New dewatering tank—Atlanta Sand and Supply Co.

with an 8-in. pump and cutter and put up a sand collector which has been really designed to save sand of a certain grading. A new power plant has been built. This has return-flue tubular Schofield boilers and a 20x22 Skinner automatic engine which is direct coupled to a 250-kw. General Electric generator. Current is made at 550 volts and sent to motors without transforming. A pump house has been built and it contains an 8-in. Gould pump driven by a 50-hp. squirrel cage General Electric motor. The pump on the dredge is a heavy duty dredge-type pump made by the American Manganese Steel Co. and it is to be driven by a 150-hp. General Electric motor.

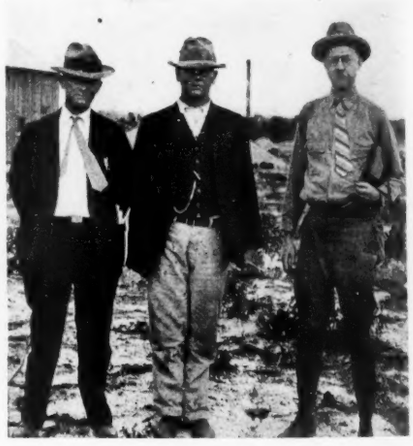
Until the dredge is ready (it was waiting for the cutter when this was written) the power will be used to drive pumps on skids which will pump to cars the material washed down by guns and prepare the ground for dredging later on.

"Gunning" the bank, Atlanta Sand and Supply Co. This method of removing sand is used greatly in the district

This deposit contains fine sand above and a coarser sand below, and both are marketable. The lower sand is apparently pure silica, as white as snow and showing no impurity except a little clay on the surface. It washes to a high grade of silica sand. Laid down with this are strata of kaolin, so this part of the deposit much resembles the beds worked for china clay and sand at Leesburg, Fla., where both products are marketed.

Glass Sand Found in Places

Good silica sand is reported from several places in this part of Georgia, and it is possible that a market for it, to be used as glass sand, may develop a little later. It is said there is enough waste gas from the furnaces and by-product plants at Birmingham to supply the needs of a glass plant, and it has already been proposed to establish one there. If this is done, the silica sand deposits will become valuable as a fairly close source of supply for the Birmingham market.



Left to right: J. H. Brown, R. L. Brown, Dr. Poole Maynard

New dredge under construction for the Atlanta Sand and Supply Co.

Construction view of the Atlanta Sand and Supply Co.'s power plant

Air Separation Methods Used in Fine Grinding of Rock Products

III.—Machines in Actual Use—Separators Attached to Grinding Mills

By Edmund Shaw
Editor, Rock Products

Effect of Vacuum

In 1920, S. B. Kanowitz, engineer for the Raymond Bros. Impact Pulverizer Co., wrote an article for ROCK PRODUCTS[3] on the theory of air separation which was widely read and commented upon and which was afterward reproduced in a government publication. In the main the theory is that which has already been given here, but Mr. Kanowitz adds an extra effect due to the partial vacuum maintained in the Raymond separator. As the air is rarefied its bouyancy decreases causing particles of smaller and smaller sizes continually to drop out, making the finished product entering the collector finer and finer. It is because of the use of this principle that the machine is called the Vacuum Separator. The partial vacuum is an effect produced in other types perhaps, but the Raymond appears to make the greatest use of it.

The Raymond Air Separator

A comparison of the article of 1920 and the latest Raymond catalog shows little or no change in the design or construction of this separator. Originally it was made only as an integral part of the Raymond mill, but now it is built for use with the Raymond pulverizer or separately with any other machine such as a tube mill.

The Raymond mill consists of a horizontal circular tire against the inner surface of which rollers press by centrifugal force. The material is ground between the rollers and the tire. These are enclosed in an air-tight case and the feeder is arranged to let little or no air enter with the feed. The case is connected with the air separator proper, above which is connected the suction pipe of a fan that draws air through the mill and separator.

The air enters through ports below the rollers and these ports are set at an angle to give the air a whirling motion. The case enlarges as the air rises so that the velocity of the whirling current is reduced and the heavier particles drop back into the mill. Thus the mill casing acts as a preliminary separator.

The remainder of the product goes with the air current between the inner and outer cones of the air separator, the construction of which is clearly shown in the cut (Fig. 10). At the top it enters the inner cone through a series of blades which impart a centrifugal motion. These blades are adjustable, which makes the centrifugal motion variable, according to the product wanted. They may even be set radially so that no centrifugal motion is imparted. This is the principle adjustment of the device, by which the product is made coarser or finer. The fine finished product goes through the fan to a large cyclone collector and the exhaust from the cyclone is returned to the air ports of the mill, in most cases putting everything in closed circuit and making the operation dustless. In some cases where a "superfine" product is wanted the exhaust of the cyclone is sent to a bag collector, an air filter, which collects the dust in woolen or cotton bags. The rejects fall down the inner cone to a flap valve through which they are discharged into the mill as they accumulate without the admission of much air to the cone.

The reject from the inner cone instead of being returned to the mill for further grinding is often removed by an inner cone screw conveyor which delivers outside the mill a granular product suitable for many industrial purposes, thus making two finished products.

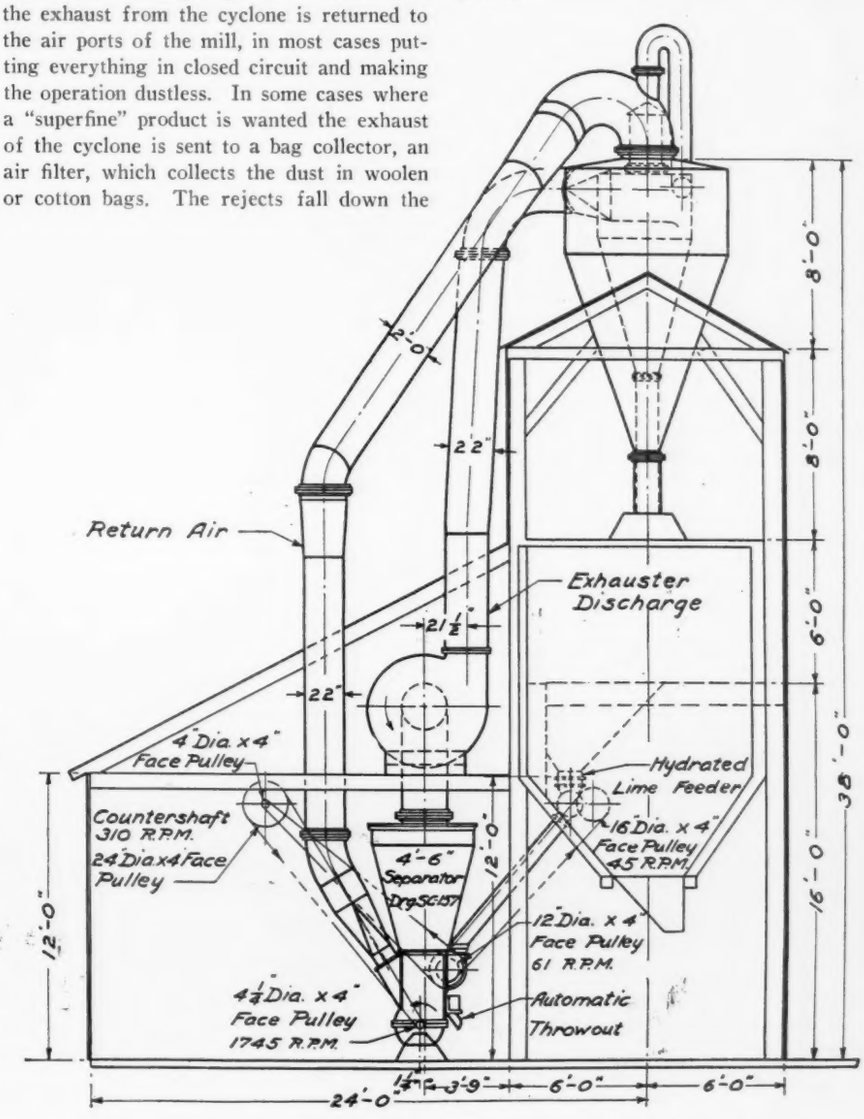


Fig. 11. Air separating plant for removing core and unburned pieces from hydrated lime

[3] "Principles and Practice of Air Separation," ROCK PRODUCTS, issue of April 10, 1920.

In some cases the suction of the fan is also used to control the feed to the mill through the apparatus known as the Raymond pneumatic feed control. This regulates the amount fed to the mill by the amount of product discharged which keeps the mill from being overloaded or from running with too light a load.

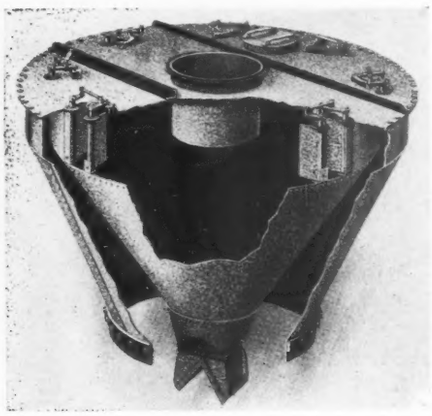


Fig. 10. Showing the adjustable blades to give whirling motion to the air

The Raymond system has had a wide application in the rock products industries for grinding lime, limestone, gypsum, phosphate rock and other mineral substances besides grinding coal for burning in the cement and lime industries. It appears to be used to a greater extent than any other air separation device in the rock products field.

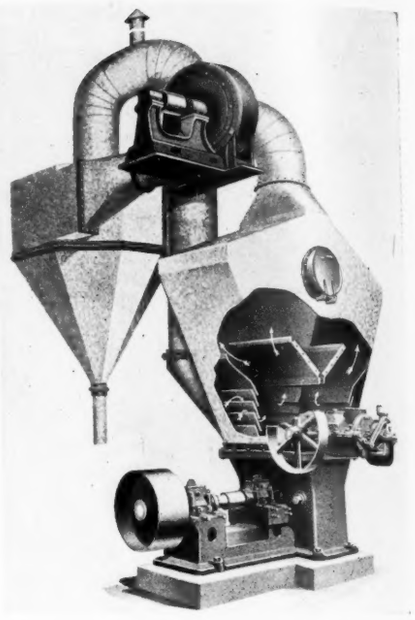
Fig. 11 shows a Raymond automatic pulverizer and air separating system such as is very commonly used in lime hydrating plants. A typical double Raymond mill installation is also shown.

The Bonnot Separator

Another separator attached to the top of a grinding mill is made by the Bonnot Co., Canton, Ohio. It operates with a partial vacuum, sucking the product of the mill into an expanding chamber and thus decreasing the velocity of the current and allowing the coarser particles to fall while the lighter go out of a pipe at the top. The heavier particles fall into a chamber from which they are returned to the mill by gravity.

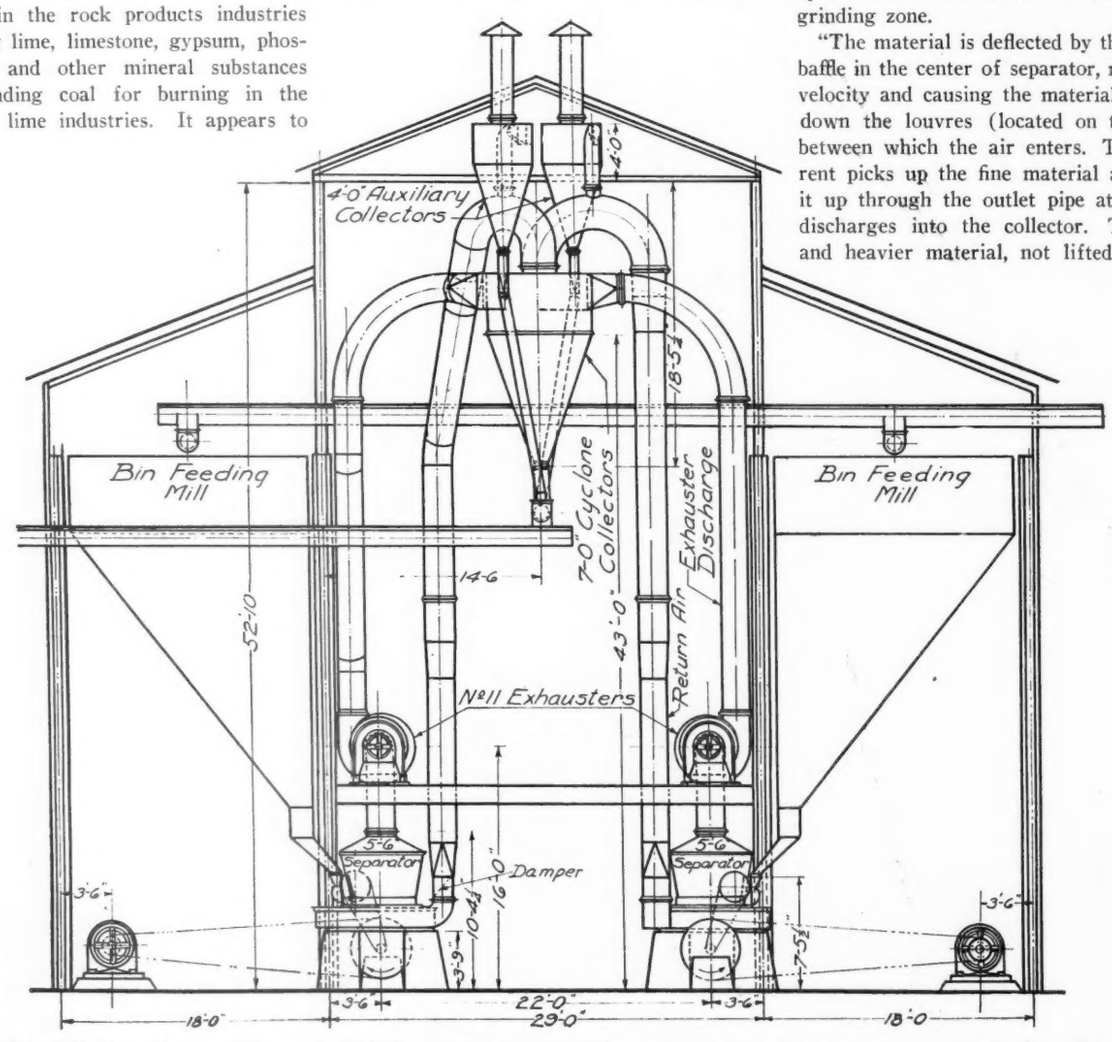
This separator attached to the mill is shown in the cut on page 55. The description which follows has been furnished by the makers of this machine:

"The base of the separator is attached to the top of the main frame, directly over the grinding chamber. The separator is made with sides diverging to form a large air chamber into which the material is thrown by the driver in a constant stream from the grinding zone.



Showing mill and separator and the octagonal collector

"The material is deflected by the V-shaped baffle in the center of separator, reducing the velocity and causing the material to cascade down the louvres (located on three sides) between which the air enters. The air current picks up the fine material and conveys it up through the outlet pipe at top, which discharges into the collector. The coarser and heavier material, not lifted by the air

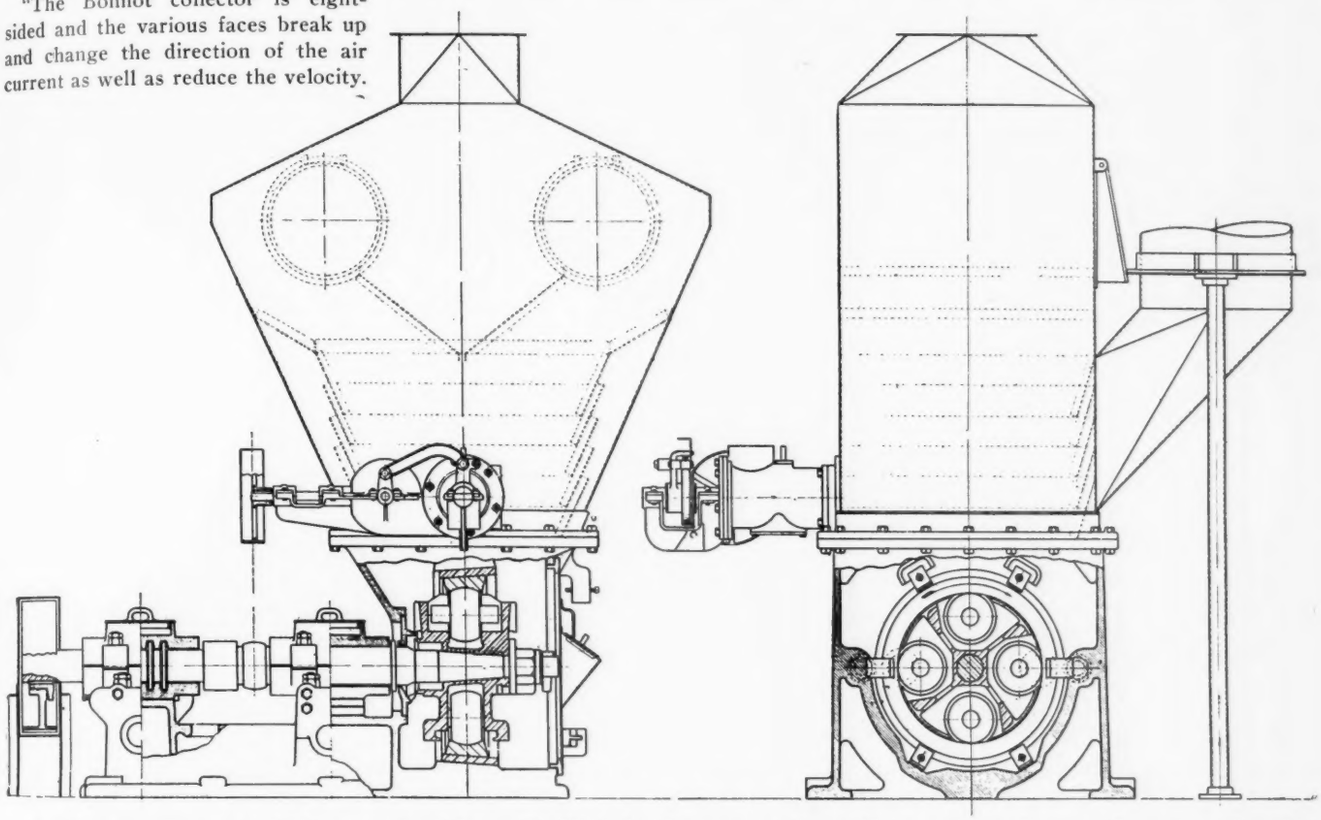


A typical installation of two mills each with its air separator. The product from the separators attached to the mill goes to the collectors above and the air which accompanies it is returned to the mills. Note the small collectors on the excess air relief pipes

current, falls into the grinding chamber by gravity until it is ground fine enough to be carried to collector by the air current.

"The air carrying the fine material passes from the separator through the exhauster to the collector.

"The Bonnot collector is eight-sided and the various faces break up and change the direction of the air current as well as reduce the velocity.



Another separator attached to a pulverizing mill which has louvres on three sides to catch and return the unground product to the mill. The collector for fines is not shown here

This action causes the material in suspension to drop to the discharge pipe at the bottom."

Machines of this type have been largely used for grinding pulverized coal; and also for gypsum, phosphate rock, cement, raw material and cement clinker.

(*To be continued*)

Adhesion of Mortar to Sand-Lime Brick

A CONSIDERABLE number of tests have been made at the U. S. Bureau of Standards on the adhesion of mortar to sand-lime brick. The program included a study of different factors influencing the results, such as the kind of mortar, the percentage of water in the brick when used, the consistency of the mortar, and percentage of water absorbed in a definite time, as well as different storage conditions. Especial attention has been given to the subject of the percentage of water absorbed per unit of time and its effect upon the results. No attempt has been made to evaluate the quality of the workmanship, the aim being to get a good contact of mortar and brick regardless of the rates of absorption.

The tests on the effect of different percentages of water taken up by the bricks in a definite period were made on six makes of sand-lime bricks. One make of sand-lime bricks was divided into groups according to the amount of water absorbed through one side in one hour. Bricks within the groups which absorbed 1.5, 2.5 and 3.5% of water were mortared together with 1:3 cement mortar by weight, containing 23% water. The adhesion of the mortar to the brick in these joints in 28 days was 18, 27 and 38 lb. per sq. in., respectively. (These results were the averages of 10 joints of each.) The ranges in the amounts of water absorbed in one hour through one side of the bricks of two groups of another make of sand-lime brick were 11.7 to 23.3%, and 3.2 to 8%; the adhesion of the mortar to the bricks in these groups was 35 and 18 lb. per sq. in., respectively. Similar results were obtained with the four other makes of sand-lime bricks. The conclusion is that where the entire faces of both bricks are brought in contact with the mortar while it is sufficiently wet, greater adhesion is obtained with bricks of high than with low water absorption when immersed as outlined above. The probable explanation is that the more absorptive bricks draw water out of the mortar more rapidly than the less absorptive bricks; that some cement is brought into the surface pores by this action; and that the mortar becomes denser as a result of tapping the bricks with the the trowel while the water is being absorbed.

It was found that manufacturers use different sands, and that the resulting texture of their bricks differs. This difference in texture of a brick is an important factor, which probably accounts for the fact that different makes of bricks used with the same mortar develop different degrees of adhesion to the mortar, although their percentage absorption may be the same.

Further tests are to be made with bricks that have received different percentages of water before use, for many bricks are too absorptive to be used dry with good results. —*Technical News Bulletin*, of the U. S. Bureau of Standards.

Phosphate Deposits of Madagascar

TWO types of natural lime phosphates exist in Madagascar; the phosphates of the lower Cretaceous period (Albien) and those formed by the transformation of guano into phosphates, on certain of the islands in the Mozambique Channel, off the coast of Madagascar. The later comprise a maximum of 500,000 tons.

A merchant of Nossi-Be recently took over a concession originally granted in 1914 and has been exploiting the deposits on the island of Juan de Nova. During 1926 he shipped 5,950 tons, of which 5,250 went to New Zealand and 700 tons to South Africa.

A detailed description of the Madagascar deposits is available upon request to the Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Cement Mills Start Greatest Safety Drive

Mobilization on a Scale Never Before Attempted in Industrial Accident Prevention Work

By A. J. R. Curtis

Assistant to General Manager, in Charge of Bureau of Accident Prevention and Insurance, Portland Cement Association

ON June 1, the cement mills and quarries comprising the membership of the Portland Cement Association in the United States, Canada, Mexico, Cuba and South America will unite in an attempt to operate during the entire month without an accident. There are about 85 operating companies 154 mill units, most of which include one or more quarries and clay pits, 1500 departmental organizations and 45,000 workmen.

Official campaign flag flying below the national emblem

Member Companies Enroll

As a forerunner of the month's effort, the presidents or principal executive officers of the cement companies are enrolling their company organizations by subscribing to the following statement:

"This company commits itself to whole-hearted co-operation for the reduction of industrial accidents and endorses fully the June No-Accident Campaign of the Portland Cement Association. We subscribe with pleasure to the general plan of the campaign and will suggest to our operating department the enrollment of every unit in our works, reaching, if possible, every individual workman.

"For the protection of our present workers and in the interests of general efficiency, this company will not hire careless men. We believe that every employe on our rolls is anxious to cultivate personal habits of safety and with that end in view will accept enthusiastically the challenge implied by this campaign. Our company may be counted on, so far as humanly possible, to operate during June without an accident."

Following the enrollment by the executives the superintendents of each mill organization are committing their mills to the campaign, each one signing the following declaration:

"This mill hereby enrolls in the June, 1927, No-Accident Campaign of the Portland Cement Association. Please send us at once the necessary quantity of plant department enrollment blanks for our use in enrolling all departments of the plant over the personal signature of our foremen and department heads, obligating each one within his own jurisdiction to carry all features of the campaign to a successful conclusion.

"Please send us our official June campaign flag, which we agree to fly on the flag pole of our plant, as prescribed in the

Safety committee of the La Salle, Ill., mill of the Alpha Portland Cement Co.

Tells its story in a manner understood by all—one of the slogans adopted by the companies

In a position before the entrance of the mill where its significance must be noted

campaign outline, from June 1 until such time as a loss of time may begin in our plant as the result of an accident. Should a lost time accident occur, the flag will be taken down and returned promptly to the Portland Cement Association with a detailed report covering the accident which caused us to lose it."

A somewhat similar enrollment is subscribed to by each department head and foreman in which promises are given to secure the support of all workmen and to conduct the department without injury to anyone.

The Security mill features its brand name in its safety posters, as do many others

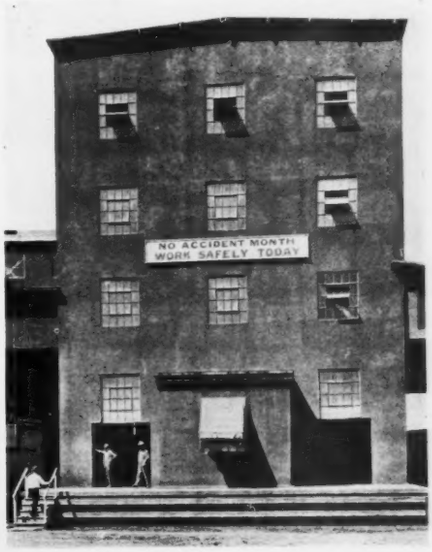
The department heads are also depended upon to distribute the individual "safety cards" to every worker, securing his signed pledge to work during June without injury to himself or any other. It is estimated that in this way between 45,000 and 50,000 individual safety pledges will be secured before the month's campaign is under way.

Safety committee, Dallas, Tex., mill, Texas Portland Cement Co.

Safety Mass Meetings to Be Held

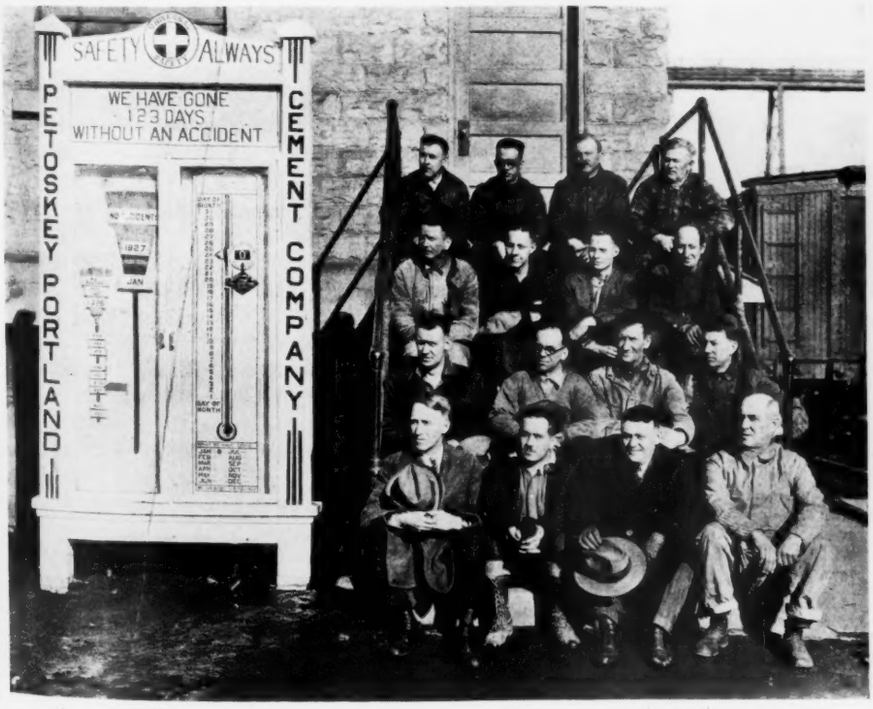
What is perhaps one of the most amazing features of the drive is the plan to hold a safety mass meeting in every cement plant in the membership of the Portland Cement Association on June 1. The services of 50 of the best safety speakers have been secured and a large number of mayors, local plant superintendents, safety engineers, clergymen, physicians and educators have volunteered their services in helping to make these meetings a success. Not less than 500 safety messages will be delivered at these meetings, committees will be organized, trophies announced and in a number of cases bands will be out and refreshments provided. As a climax the green and white safety flag, furnished to each mill by the Portland Cement Association, will be raised on the plant flag poles under the national flag. The safety flag may continue to fly until the plant has a lost time accident. In case of accident the flag must be lowered and returned to the Portland Cement Association.

From that point on the energies of the entire operating organization throughout the industry will be concentrated on keeping the safety flag flying. Every foreman is required to see that it is flying when he goes on duty and to leave it flying when he goes off duty.



Every cement mill has posters and reminders in prominent positions

To the Lehigh Portland Cement Co. probably belongs the credit for the original no-accident month campaign conducted seven years ago in June. Since that time the Lehigh company has conducted such a campaign annually. In 1925 all of the companies holding membership in the Portland Cement Association conducted a similar campaign with results so effective that the committee on Accident Prevention and In-



Petoskey Portland Cement Co. safety committee—one of 150 alert groups which are leading the June no-accident campaign

surance at its last annual meeting unanimously decided to hold the present campaign. The National Safety Council has also joined in the campaign enthusiastically. Managing Director W. H. Cameron recently wrote as follows:

Safety Council Endorses Campaign

"Permit me, on behalf of the National Safety Council, to wish you every possible success in your June No-Accident Campaign. It is my hope that when the 16th annual Safety Congress is held in this city in September that we shall have the pleasure of stating your efforts have been resultful.

"The progress of the cement people in the conservation of lives and limbs has won the admiration and respect of every industry in the nation. We constantly refer to your fine records in our endeavor to encourage other industries to attain their own goal.

"I trust that every man in the cement industry will do his respective share to help keep the safety flag flying over his particular plant not only during your June No-Accident Campaign but throughout the year.

"May the workers in the cement world show the millions of other employes in other industries that accidents really are not necessary and can be avoided.

"I am glad to note that several large companies are refusing to hire careless men. The careless worker is not only a menace to himself but to other employes whose lives and limbs must be safeguarded. Once it is generally recognized that recklessness will not be tolerated, we shall see an improvement in the situation.

"Please advise us of the progress of your campaign so we can tell our other members of your success."

Membership

Membership of the committee on accident prevention and insurance of the Portland Cement Association is as follows:

J. B. John, vice-president, Newaygo Portland Cement Co.; David Adam, safety engineer, Lawrence Portland Cement Co.; D. N. Armstrong, vice-president, Missouri Portland Cement Co.; Geo. F. Bayle, Jr., second vice-president, Glens Falls Portland Cement Co.; George F. Coffin, secretary, Nazareth Cement Co.; Fred David, plant superintendent, Santa Cruz Portland Cement Co.; W. R. Dunn, works manager, Vulcanite Portland Cement Co.; R. Frame, Alpha Portland Cement Co.; T. F. Halpin, assistant to general manager, Marquette Cement Manufacturing Co.; A. F. Krabbe, superintendent, the Olypmic Portland Cement Co., Ltd.; Willam Moeller, general superintendent, Texas Portland Cement Co.; R. J. Morse, secretary, Colorado Portland Cement Co.; C. N. Reitze, vice-president, Superior Portland Cement, Inc.; A. C. Tagge, vice-president, Canada Cement Co., Ltd.; H. A. Reninger, special representative, Lehigh Portland Cement Co.; F. E. Town, superintendent, Manitowoc Portland Cement Co.

Regional Safety Conference Held at Allentown

ON Thursday, May 19, the cement mill operators of the Lehigh Valley region held their annual safety conference at the Elk's Club, Allentown, Penn., with an attendance which taxed the capacity of the club. Over 250 cement men were there—from executive to workman—representing almost every cement mill and quarry in the valley as well as several at a distance.

The meeting was unique as a gathering of conservative if not hard headed operators for the idealistic and inspiring purpose of banishing accidents from the cement mills and quarries of that region. Russell Frame of the Alpha Portland Cement Co., who is chairman of the cement section of the National Safety Council, acted as chairman of the meeting. Hon. Charles A. Waters,

B. F. Affleck, president of the Universal Portland Cement Co., signing the pledge enrolling 3500 mill employes in the campaign

secretary of labor and industry of the state of Pennsylvania, was the principal speaker. He talked upon "Safety Education" and pledged the co-operation of the state in the present great campaign of the industry to rid itself of accidents.

Interesting Speakers Inspire

Another interesting speaker was W. H. Weitknecht, superintendent of the Lehigh Portland Cement Co.'s plant at Mitchell, Ind., which, in 1924, and again in 1926, operated during an entire calendar year without a single lost time accident. With Mr. Weitknecht were N. G. Mather and Harry Whittington, representatives selected by the workmen of the mill to journey to New York for the purpose of formally receiving the trophy from the Portland Cement Association. There were also present Messrs. W. J. Cooper and F. W. Harper of the Winnipeg plant of the Canada Cement Co., which also won the trophy by operating without an accident during 1926.

A. J. R. Curtis, assistant to the general manager of the Portland Cement Association, appealed to the meeting on behalf of the June No-Accident campaign to which the industry is committed in an effort to run during the entire month without accident. Mr. Curtis announced that the executives of 80 cement companies had pledged the interest and resources of their organizations for the success of the campaign and that 140 superintendents and over 2200 foremen had promised to employ every possible bit of skill and ingenuity to keep their 45,000 workers from getting hurt. Every workman in the industry is being given an opportunity to pledge his support by working safely and protecting others around him. Approximately 20,000 had already signed and eagerly returned these pledges, said Mr. Curtis.

As one of the interesting incidents of the meeting all those who had signed pledges in the June campaign were requested to arise. About half of those present were on their feet instantly. Then those remaining seated were asked to pledge their help. Unanimous response led to general and prolonged applause, as it was realized that practically every important plant in the greatest cement producing region in the world was represented by its leading plant officials and workers.

Dinner was served at 6:30 p. m. to a crowd which taxed every available bit of floor area in the spacious club house. Several delegations from nearby mills, although on duty during the afternoon, hurried to the dinner, which has now come to be regarded as the principal event of the year in Valley cement circles. Rev. Simon S. Sipple, pastor of the Liberty Bell Church of Allentown was the first speaker. Rev. Sipple, who is president of the Allentown Rotary Club and a familiar figure among the cement mills, declared that the success of the safety movement must be based on these great principles—familiarity with the work, eternal vigilance, constant preparation, great determination and unbounded enthusiasm.

Following Rev. Sipple's address, the toastmaster, Major H. A. Reninger of the Lehigh Portland Cement Co., introduced Attorney Lawrance Rupp, known as one of the most eloquent speakers of eastern Pennsylvania. Mr. Rupp's address spread contagious optimism as he asserted and proceeded to prove that the world is constantly growing better and human relations are governed by the golden rule as never before. Major Reninger read an inspiring telegram from Col. E. M. Young, president of the Lehigh Portland Cement Co., who was unexpectedly prevented from attending.

The success of the affair must be attributed almost entirely to the untiring efforts of the local committee, consisting of H. A. Reninger, Lehigh Portland Cement Co., R. Frame, Alpha Portland Cement Co., David Adam, Lawrence Portland Cement Co., O. D. Havard, Giant Portland Cement Co.; M. Fortuin, Pennsylvania-Dixie Cement Corp.

Benefits of Standardization to Cement Industry Outlined By Dr. Burgess

Production of Uniform Commodity Pointed Way to Progress, in Opinion of Director of Bureau of Standards

THE application of standard specifications to the cement industry, with revisions taking place as new discoveries were made, has produced a commodity of practically uniform grade used in enormous quantities for a great variety of purposes in a highly competitive industry, according to Dr. George K. Burgess, director of the United States Bureau of Standards. Dr. Burgess' view was given to the members of the Portland Cement Association at their annual meeting in New York City, May 17. Standardization methods, he said, have proved highly profitable to engineering and the government and industry now have practically a single standard for cement.

The full text of his address follows:

Standard specifications establishing minimum requirements of quality are as essential in the design of engineering structures as the mathematics formula used. Strength of materials enters into the design formula and must be based on a standard of value or performance which the standard specifications provide.

Important Changes Noted in Last 25 years

The last 25 years have witnessed important changes in the engineering profession and the engineering industries with respect to standard specifications and practices. The practice of engineering in its modern sense requires the application of standards of materials, as well as standards of mathematics and physics.

Advocates of standard practices and standard specifications a few years ago prophesied progressive developments as a result of standardization whereas opponents of the movement feared that standardization would retard further technical and scientific developments. They feared that manufacturers and engineers alike might fall into a self-satisfied attitude and not continue with research and practical experimentation which usually are accompanied by improvements.

Time has enabled us to examine the effect in some detail of standard specifications and the experience with portland cement furnishes an outstanding example of a manufactured commodity commonly used in great quantity by the engineering profession and construction industries, for which commodity standard specifications have long been in use. After many years of investigation and experiment the standard specifications and tests for portland cement were adopted by the American Society of Civil Engineers and the American Society of Testing Materials. Thus, 23 years ago the first A. S. T. M. specification for portland cement was adopted, but it has been revised in 1908, 1909, 1916, 1920, and 1926.

Revisions Resulted From Much Research

The various subcommittees continued their research and study from year to year and the revisions which took place in these several instances were in every case the result of experiment by the committee. It was thus shown that the adoption of the standard specification would not terminate effective work on the specifications and methods of tests. In fact, it seemed to stimulate such activity. During these many years of investigation of the properties of portland cement the National Bureau of Standards of the U. S. Department of Commerce has taken an active part. It embodies in its personnel trained specialists on portland cement and concrete through whom it has served engineering societies, the engineering profession and the engineering industries in an outstanding manner. The standard specification for portland cement was adopted as American Standard No. 1 by the American Engineering Standards Committee on March 31, 1922.

The adoption of the specifications by the American Society for Testing Materials did not mean immediate adoption by the engineering profession, but in a surprisingly short time the users realized its advantages. In later years it has been used almost exclusively on engineering work requiring portland cement, thus providing a universal standard of quality for portland cement adopted by both producers and consumers. This has played an important part in the improvement and extension of the uses of portland cement.

This specification has of course been under attack from time to time and perhaps many cement users have felt that a standard specification for cement should serve as a guarantee of good concrete. This would not possibly be the case as the widely used structural material, concrete, is manufactured in the field under a great variety of conditions and subject to the methods of use employed by a great variety of users.

Ten Years' Progress Compared to Prior 100

Since the adoption of the standard specifications, however, noteworthy developments in the use of the product have ensued. It has been said that the developments of the last 10 years in concrete and reinforced concrete have been greater than in the prior 100 years since portland cement was invented. Whether this be true or not cannot be definitely substantiated, but it is well known that the developments in the use of the product in the last 10 years have been astonishing.

The American Society for Testing Materials has committees at work on standard specifications and practices for concreting materials and has developed more than a dozen specifications now widely used by engineers in the field in designing and controlling concrete construction. The manufacturers have cooperated on all of these committees and have done a substantial portion of the research work in cooperation with other groups which has made possible the developments referred to.

By executive order of President Taft in 1912 a departmental conference of government representatives was called which agreed upon standard specifications for portland cement for all government work. Through cooperation with the manufacturers and users represented in the American Society for Testing Materials, the standard specification was employed for government work. Proposed revisions by governmental departments have been made to the A. S. T. M. committee through the Federal Specifications Board since its establishment in 1921, so that in 1926 the revisions on the part of the government and of the American Society for Testing Materials Committee were again made concurrently and the requirements for portland cement advanced under the widely accepted procedure for such changes. The government and industry now have practically a single standard for cement.

New Discoveries Witnessed Each Year

Hardly a year has gone by which has not witnessed new discoveries in this important engineering field. In 1924, the Portland Cement Association established a fellowship arrangement under the U. S. Department of Commerce in the National Bureau of Standards in which are being studied some of the fundamental characteristics of portland cement. Studies on the constitution of portland cement clinker and hydration properties of portland cement are being attacked in the most fundamental manner. No predic-

tions are available at this time as to the outcome of these experiments, but it is especially significant that this development has followed the wide acceptance and adoption of the Standard Specifications for portland cement. Adherence to this standard by the users has been phenomenal over the last 10 years.

It would seem that the machinery for making and perfecting standard specifications works admirably and effectively. The wide acceptance of the standard specifications has been a spur to more developments rather than a retarding influence. It has enabled the manufacturer to improve mill practices by methodical study and investigation, and to proceed with the development in the use of the product, which has been phenomenal.

The engineering profession has been able to profit by this situation. Through the adoption and general use of a basic standard of quality, engineers have developed design and control standards in a most effective manner. Building codes have been revised, improved and simplified; the Joint Committee on Concrete and Reinforced Concrete has developed a basic report which has wide influence in the engineering profession; and many lesser, but none the less striking, results have taken place in all aspects of the use of this increasingly important engineering material.

Needs of Engineers Can Be Fulfilled

With a portland cement of basic standard quality, such as is obtainable under the standard specifications, concrete of great range in strength can be secured through the knowledge which has been developed in recent years. Concrete of desired strength within reasonable limits may be secured through variation of kind, quality, proportions and mixing of materials, including water with portland cement. If the engineer desires concrete of unusual high strength for given purpose it may be secured by devices now commonly understood in the engineering profession. It has been found, that if working strengths are needed at periods of a few days or a few weeks the knowledge is available for making concrete which may be used within a very short time of its fabrication. These are purely engineering developments in the uses of the material and which may be secured alike by anyone using cements which conform to the standard specification which is in such general use in all parts of the country.

The cement industry holds a remarkable position in the national economy, producing under highly competitive conditions in widely distributed plants a commodity of practically uniform grade used in enormous quantities for a great variety of purposes, facing serious competition from abroad, as well as pressure from interests within the country and even within the industry for a divergence or multiplicity of standards. There may be limited needs for special cements, but experience has shown that the great bulk of this commodity can meet nearly, if not quite, all the requirements if manufactured to a single standard, with attendant advantages to manufacturer and consumer. The establishment of one or more research centers gives the assurance for making available to the industry improvements in the product that can be absorbed by the industry with eventual incorporation into the national specification as may be warranted as progress is made. Standardization based on research and service does not make for stagnation but for progress. But eternal vigilance is necessary.

Hold Spring Meeting of Portland Cement Association in New York

THE annual spring meeting of the Portland Cement Association, a three-day session, was held at the Biltmore Hotel, New York, May 16, 17 and 18, with an attendance of slightly more than 300 executives, officers and representatives of portland cement manufacturing plants throughout the United States and Canada. Sixty-four cement companies were represented at the meeting.

Opening with committee meetings Monday morning, the various officials entered immediately into consideration of problems of accident prevention, conservation, fire insurance, transportation and technical problems arising in connection with cement manufacture.

What is claimed to be the greatest concerted safety drive ever made by a whole industry will be opened June 1, it was announced by the Accident Prevention Committee. Every man in the cement industry is being urged to co-operate in making June a no-accident month for every cement plant.

Technical problems and mill practice received attention at the general session opened Tuesday morning. An address by Dr. A. F. McBride, commissioner of labor of the state of New Jersey, was heard on the subject, "What New Jersey Does for Its Physical Handicaps Through Its Rehabilitation Division." A. G. Croll, general superintendent of the Atlas Portland Cement Co., spoke on "Cleaning Kiln Stack Gases by Water."

Dr. George K. Burgess, director of the National Bureau of Standards, gave an address, "Standardization and Standard Specifications," during the afternoon continuation of the general session. "Mixing of Flue Dust with Slurry," was discussed by R. R. Coghlan, chief chemist of the Osborn, Ohio, plant of the Southwestern Portland Cement Co.

G. S. Brown, president of the Portland Cement Association, presided and gave the principal address at the business session conducted Wednesday morning. Award of the Portland Cement Association Safety Trophy was made to the Mitchell, Ind., plant of the Lehigh Portland Cement Co., and the Winnipeg plant of the Canada Portland Cement Co., Ltd., winners of the 1926 safety contest. The two plants both ran throughout 1926 and for several months of 1927 without a single lost-time accident.

A formal banquet in the grand ballroom of the Biltmore closed the series of meetings Wednesday evening. Frank H. Smith, president of the Lawrence Portland Cement Co., was toastmaster, and Thomas H. MacDonald, director of the U. S. Bureau of Roads, was the principal speaker. "Two Thousand Years of Road Building," was the subject of an interesting illustrated lecture by Mr. MacDonald.

Cement Safety Drive Meets Approval of Labor

EFFORTS to eliminate accidents in the 150 mills and quarries of the cement industry were praised in statements made by Secretary of Labor James J. Davis and W. H. Cameron, director of the National Safety Council. Both men congratulated the executives and workers in the industry on their campaign for no accidents during the month of June.

According to Secretary Davis and Mr. Cameron the drive will not only benefit the cement industry but will serve other great industrial groups as an example in the elimination of mishaps. Upon hearing of the campaign in which practically every one of the 50,000 men in the industry has pledged himself to carefulness, the Secretary of Labor said:

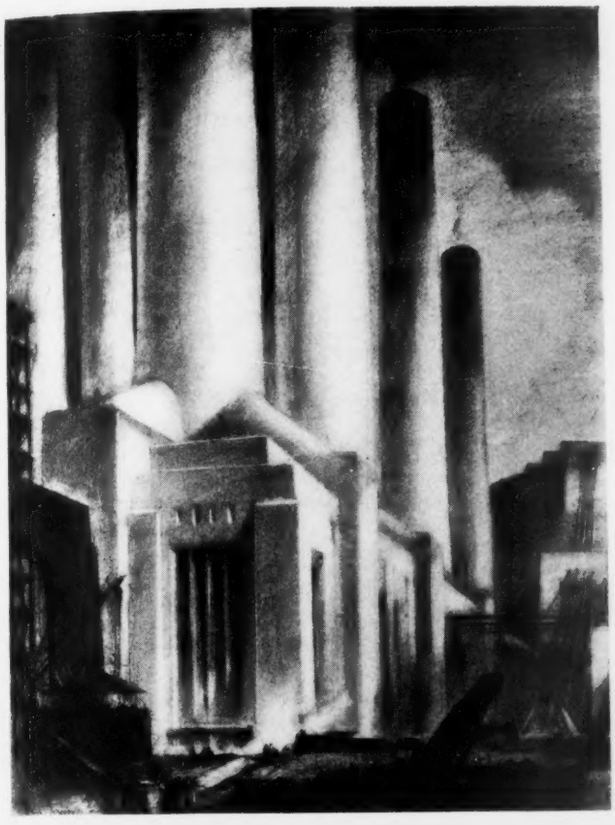
"I am glad, indeed, to see the powerful cement industry put itself squarely behind the all-important drive to scale down industrial accidents in this country. You people have tackled the right way to do it. Education is the only way. Mechanical safeguards do their part, but the American worker should not rely on artificial devices to save him from injury. In mere pride and self-respect he should look out for himself. Safety is a state of mind. Every day in the year that fact should be kept in view. Caution must be a habit. And education is the only way to bring it about."

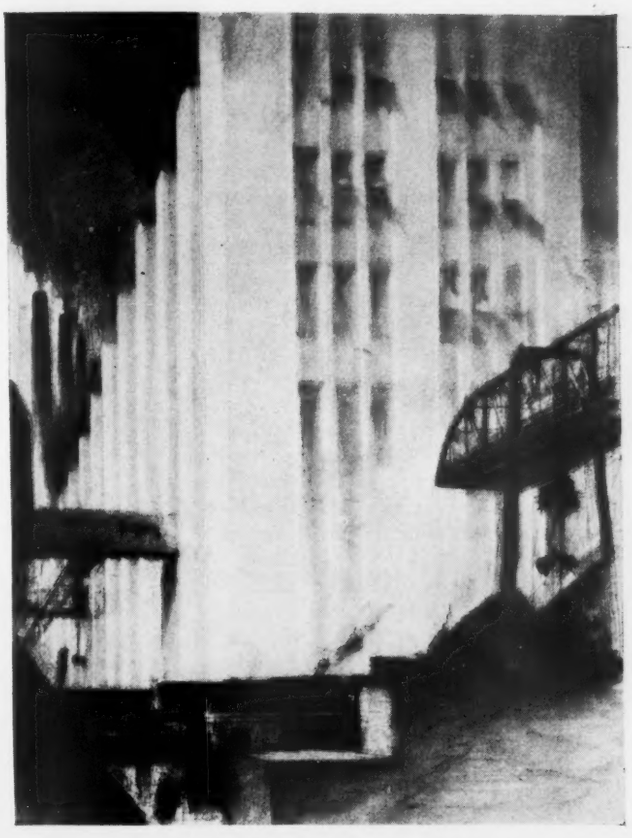
Turning to the effect the safety effort of the cement industry will have on others, Mr. Davis said:

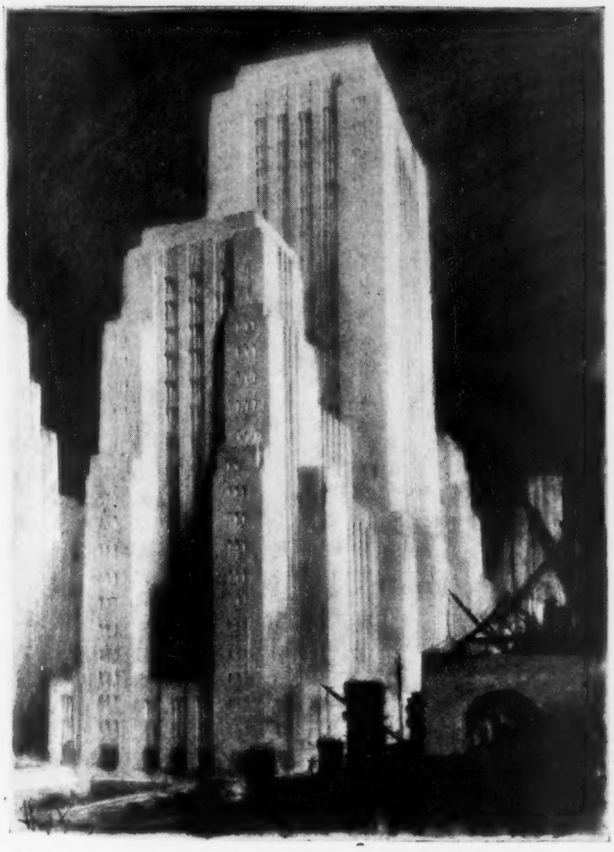
"The cement industry is setting a splendid example in this work. One after the other of the great industries are falling into line in the same endeavor. I know the country had deaths and injuries we have been tolerating in industry, to turn to in vigorous efforts to wipe out this blot on our otherwise marvelous industrial development. Now that we are all awake to the truth, I look for an early day when we may take greater pride than ever in our industrial advancement, in its new respect for human life."

W. H. Cameron, realizing the value of safety, agreed with Secretary Davis concerning the value of the non-accident effort. Mr. Cameron referred to the fine safety records already established by the companies and expressed the hope that these might be surpassed.—*Scranton* (Penn.) *Republican.*

Recent Examples of Institutional Advertising







The contemplative charcoal of Hugh Ferriss has a way of bringing out every innate quality of the most prosaic subject. In the case of concrete, he is interested in character rather than mineralogy or statistics; strength is his theme, and it is the rugged beauty of sheer strength that he expresses in the typical drawings here reproduced. Every manufacturer in this line should be appreciative of the fine work of the Lehigh Portland Cement Co.'s truly institutional and inspiring advertising campaign.—(Courtesy of Advertising and Selling, April 20, 1927)

Hints and Helps for Superintendents

Device for Loading Cars from Stockpiles

HANDLING material in and out of storage is a problem for which there are many solutions, and the particular method chosen depends on the local conditions, one important condition usually being the amount that should be spent on installation and equipment.

At the plant of the Cherokee Sand and Gravel Co., Knoxville, Tenn., material is shipped out by both trucks and railroad cars. So much of it is shipped by truck that when a storage belt to build stock piles was installed, a return belt in a tunnel to bring the material back to the bins for loading was omitted. It was judged that it would be much cheaper to install truck loaders, which could handle all the tonnage required and handle it as fast as would be necessary. With three loaders three trucks may be loaded at one time, and each loader does not have to travel far from its position.

These same loaders might have been used to load railroad cars by installing portable conveyor belts. But the arrangement shown here was worked out and it has proved very successful.

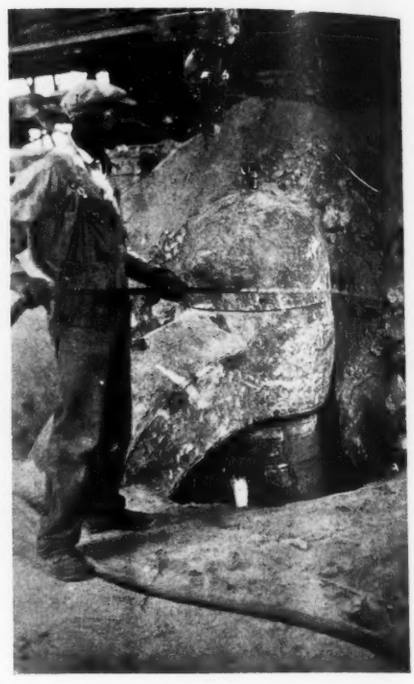
It is merely a hopper sunk below the ground level and a bucket and belt elevator to lift the contents of the hopper high enough to be chuted into the cars. In use the hopper is filled from trucks that are filled by the loaders. The trucks then back up to the hopper and discharge the load and return for another. By having two trucks and loaders working, the elevator can be kept running steadily. A 50-ton car can be loaded in 20 minutes to half an hour, which is fast enough for the tonnage handled by rail from this plant where truck delivery takes so much of the output.

All the ground around and under the stockpiles is concreted and drained so that the trucks can go anywhere easily. The hopper is put in substantially with a steel lining. There are wooden bumpers around it for the trucks to strike when they back up to dump the load. A house protects the motor from the weather. The elevator is chain driven and the buckets are closely connected. The chute may be swung so as to distribute the load evenly across the car. On the whole, this seems about as satisfactory an arrangement as could have been worked out to handle some railroad shipments in addition to truck shipments in plants of moderate tonnage. It was designed by M. E. Thompson, the manager, who is one of the owners of the plant.

Sunken hopper and elevator make effective loading arrangement

Air Hose Helps to Start Lodged Material

STICKING an air hose into a lot of crushed rock to start it flowing would appear to be a futile proceeding, but it works out very well at the No. 2 Penn-Dixie plant at Clinchfield, Ga. The rock to be crushed is a soft limestone containing a large proportion of fines. When a car is dumped the mass often settles down above the crusher in the shape shown in the picture. The original method of starting it was by working with a bar, but this was laborious and somewhat dangerous. So the air hose was tried. It blows away the packed fines and starts the larger pieces to rolling and then the whole mass comes down.



Starting a lodged crusher with an air hose

Air of course is greatly used to start fine material such as hydrated lime and cement flowing. Its use to start heavy material in this way is novel.

Effective Sliver Remover

RUNNING wood splinters or slivers into the flesh of the hand or other parts of the body are by no means uncommon in working about rock products plants. Their removal is often painful and sometimes pieces are left in the skin to fester and become generally annoying, to say nothing of the danger of blood-poisoning.

W. T. Wallace of the Connecticut Lime Corp., Canaan, Conn., offers the following sliver remover which is quite different from the usual tweezer, etc., and which he says is especially effective. He says:

To get sliver particles out of the flesh, take a fresh egg, remove the white and yolk, leaving the shell. Inside the shell is a skin; place a piece of this over the wound and it will remove the sliver particles easily.

This method, Mr. Wallace says, is not recommended for drawing boils, the drawing being too strong for people to withstand. Its efficacy as a sliver remover, he says, can be attested by the Borden Condensed Milk Co., where it has been used with much success.

Transporting a Power Shovel From One Quarry Level to Another

QUITE often, quarrying operations are carried on at different levels. In some cases, individual stripping and loading shovels are maintained at these levels. But in at least a few instances, it is sometimes necessary to bring the power shovel from one level to another. An interesting example of how this was done at the McMillan-Saunders quarry of the Indiana Limestone Co. is given below.

At this quarry a Northwest power shovel has been installed for stripping and handling discolored and unsuitable stone (this quarry produces cut stone). The overburden is approximately 50 ft. deep and must be removed in two shifts. In order to do this the machine is moved from one lift to the other. This is done by taking the machine apart. The boom is removed, the rotating base is taken off and the crawler base is placed on the new level. Then the rotating base and boom are replaced and work beings anew. The entire chance, including dismantling and reconstruction, is said to be accomplished in about three hours.

Moving a power shovel from one lift to another

Priming One Pump from Another at a Distance

AT the plant of the Roquemore Gravel Co., Montgomery, Ala., two pumps pump water from the river during dry periods, to be used as wash water in the plant. In wet weather sufficient water is obtained from the pit without the use of these pumps.

One of these pumps is set about 400 ft. away from the other. When they are in use the first pump runs almost all the time and the other is used occasionally. The second pump had to be primed whenever it was used and the pictures show the way it is primed from the first pump. A two inch line runs from the first pump to the second and a valve in this is opened long enough to fill the second pump. The foot valve holds well enough so that the water does not leak out before the second pump begins to pull.

Connections are easily made so that the second pump could prime the first if desired.

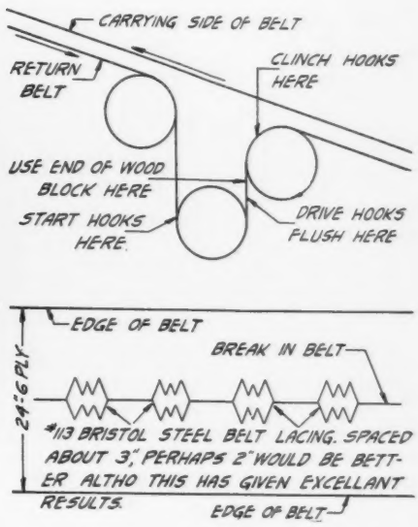
The Market for Ideas

GOT any little device or scheme which straightened out some difficulty or increased efficiency at your plant? Send it in—we'll pay $5 for it and publish it under your name. A sketch or photo and a few words is all that is necessary. Send us your ideas—let us judge their worth.—The Editors.

Repairing Torn Conveyor Belt with Steel Lacing

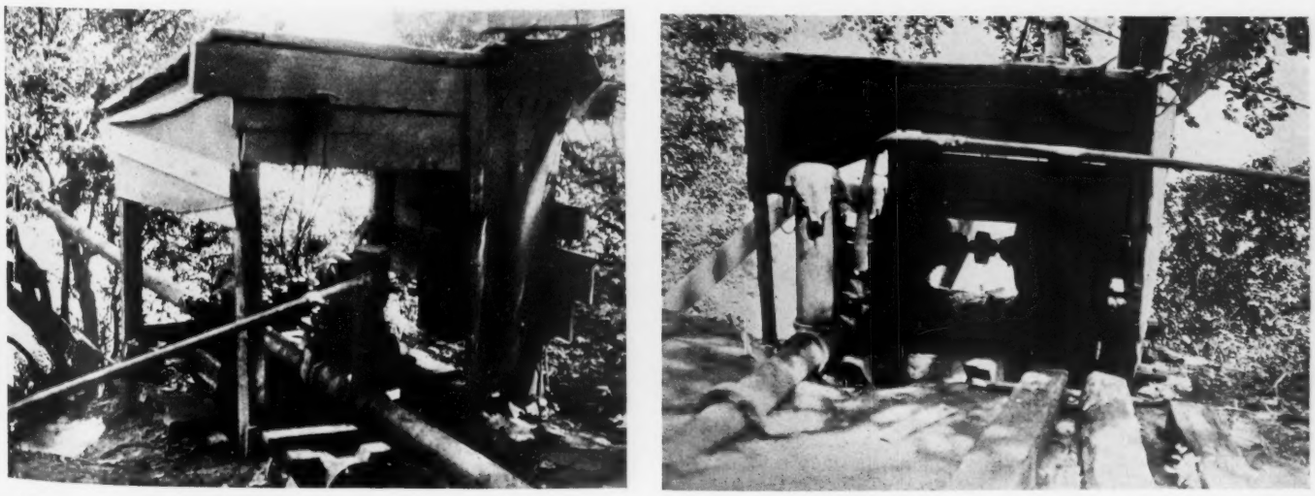
By L. E. REDDING
Superintendent, Nickel Plate Sand and Gravel Co., Fairview, Penn.

A SHORT time ago, the inclined plant conveyor belt at our operation was torn through at its center for nearly the entire length of its 260-ft. length. A section of about 30 ft. was the only portion undamaged. Since it was a practically new 6-ply "Victor Balata," 24 in. wide, it was well worth repairing, provided the expense was not too great. The sketch shows how we made the repairs, using Bristol No. 113 steel belt lacing spaced 3 in. apart.



Illustrating the method used to repair torn conveyor belt

The entire repair job was made by six men in about 7 hours. Since repairing, it has been used for the remaining half of last year's season, and from its appearance ought to last at least one more season. To keep it in good working condition, the occasional renewal of hooks, which may break off on account of the wear of the take-off pulley on them, may be necessary.



Priming one pump from another at a distance. Left—The first pump and right, the second pump which is 400 ft. away

New Plant of the Crystal River Rock Company, Florida

Just Rebuilt to Produce 4000 Yards Per Day

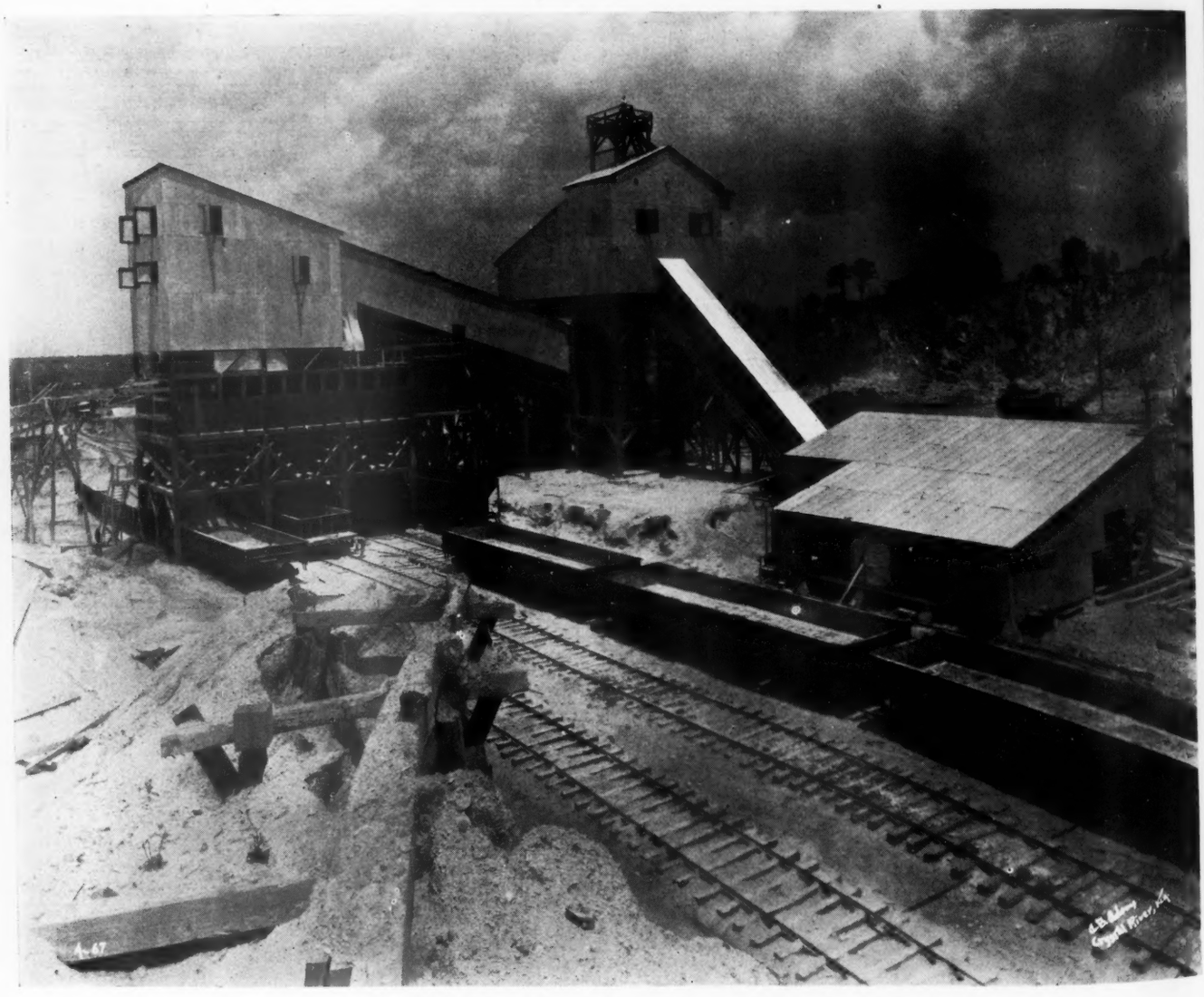
By G. L. Abbott
Superintendent, Crystal River Rock Co., Leesburg, Fla.

QUARRYING operations have been carried on at Crystal River for 15 years, but it was not until about four years ago that a crushing plant to produce about 20 cars a day was built. We have just rebuilt this plant to produce 4000 cu. yd. per day.

Quarrying is done with two Marion 37 shovels, one electric and the other steam operated. Each is equipped with a 1¾-yd. bucket or dipper. The drilling is done by two well drills, one electric and one gasoline. Both tripod and Jackhamer air drills are used for secondary drilling. The quarry face is about 100 ft. high and 2000 ft. long. End-dump, all-steel cars, running on a double-track incline, feed the crusher.

Our primary crusher, recently installed, is a 36x60-in. Fairmount (Allis-Chalmers) single-roll crusher. A chain-bucket elevator 42x36x22-in., 123-ft. centers, takes the product of the primary crusher to two scalping screens, each with three shells. The outside screen, or shell, is 96 in. in diameter and 24 ft. long. The primary crusher is set to about a 5-in. opening.

The screenings from the scalping screens are removed and go to a 24-in. belt conveyor, 96-ft. centers, which delivers them to four shaker screens. These shaker screens remove the ⅝ to ½-in. stone. The minus ½-in. screenings are delivered to a wet, revolving screen, 60 in. by 20 ft., and there washed clean. The screenings then go to



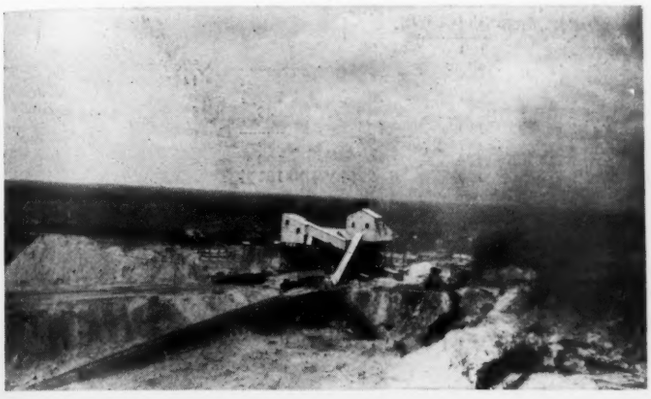
General view of the rebuilt plant of the Crystal River Rock Co., Crystal River, Fla.

bins or stocked in ground storage.

The 1- to 3-in. rock from the scalping screens goes to a 30-in. belt conveyor, 96-ft. centers, and is delivered direct to loading bins. The tailings (oversize) from the scalping screens go to a 24x54-in. roll crusher (Ocala Iron Works), which reduces all the material 1¼-in. and smaller. A belt and bucket elevator takes this material to a 60-in. by 24-ft. revolving screen, where it is sized for concrete aggregate. This concrete aggregate is then passed through wet screens or washers before going to loading bins.

Crushed stone for ballast the 1- to 3-in. size) is supplied the Atlantic Coast Line R. R. Three sizes of washed concrete aggregate and washed screenings for hard-road base are produced. These screenings have a very high cementing quality—binding together like the solid rock—and are much used for railway grade-crossings, sidewalks, etc.

We consider the plant gives a very efficient and economical operation. The general plan of it was gotten up by J. Y. Clark, president of the Crystal River Rock Co., J. M. Johnson, of the Allis-Chalmers Manufacturing Co., Chicago, and myself. The construction work was done by the Maddox Foundry and Machine Co., Archer, Fla., the construction foreman being T. O. Mountain. The writer had general supervision of construction.



Distant view showing double-track incline from the quarry to the primary crusher

Quarry view showing one of the two shovels—quarry face is about 100 ft. high

Ocala-Tampa Lime Rock Co. on Capacity Basis

THE recently opened quarry at Williston, Fla., of the Ocala-Tampa Lime Rock Co. is being operated on a capacity basis, says the *Williston* (Fla.) *Sun*. The daily output is about 1000 tons of crushed and sized limestone for various purposes.

New and modern equipment has been installed at the quarry and crushing plant. A railway siding connecting the plant to the main line was recently put in.

The Williston deposit comprises about 80 acres of high calcium limestone, being about 27 ft. in thickness. J. A. Prater, vice-president of the company, is in charge of operations.

U. S. Gypsum Co. Opens New Staten Island Plant

THE new gypsum wallboard plant recently completed at New Brighton, N. Y., by the U. S. Gypsum Co., is reported to have been put in operation. It is said to be one of the largest of its kind in the country. Plant and equipment were designed by the company's engineers.

Slide at Shale Pit Endangers St. Louis Water Supply

WITH the two large conduits that furnish the entire water supply of the city of St. Louis, Mo., in danger of being partially washed out by a slide on the side of a hill along Riverview Drive at St. Cyr Avenue which is slowly moving over a shale subtratum towards the Mississippi River, workmen were busily engaged preventing a break which would cut off the water supply for an indefinite period. The mains contain the flow of water from Chain of Rocks.

The gang of laborers are digging away the side of the hill, which at a distance of about 500 ft. is moving slowly towards the river. It is estimated that the amount of water in the reservoirs would last about one day, in event the mains break by the movement of the hillside. An open ditch between the broken ends of the conduits will be constructed if the mains break.

The slide is on the property of the Missouri Portland Cement Co., which several years ago laid a shaft in the side of the hill for the purpose of excavating shale. The shaft was later filled, but it is believed that the rains of the past month settled in the fill and started the movement of the hillside.

The hill is about 75 ft. high and approximately three and one-half miles from the company's plant at Chain of Rocks. The conduits are only about 3 or 4 ft. under the surface, and the river at present is about 100 ft. distant. Both mains are above the shale strata, so that sections of them would be carried away by the slide.—*St. Louis* (Mo.) *Times*.

Story of Electric Detonator Told in New Film

"THE Story of the Electric Detonator" is depicted in a new educational motion picture film just completed by the United States Bureau of Mines, Department of Commerce, in co-operation with one of the large explosive manufacturing concerns. The film shows in graphic detail the methods of manufacture and use of this modern and highly practical device for the firing of explosives.

The first scenes of the film give a general view of a large eastern plant devoted to the manufacture, assembling and testing of electric detonators. The processes of making the small metal shells which hold the detonating charge are first depicted. An idea of the special precautions that must be taken in the manufacture of explosives is given in a scene showing the storage under water of the fulminate of mercury, which comprises the main constituent of the detonating charge. The extreme care exercised in the operations of drying, screening and mixing the fulminate of mercury is emphasized in a series of views. The next process shown is the loading of the shells, the operation being performed within a metal case by an operator who, to insure his safety, stands outside. Animated photography is employed to explain minutely the methods used in charging the shells.

The waterproofing of the detonator, by sealing with molten sulphur, is shown. Another series of views illustrates the methods by which the completed detonator is tested.

The way in which the finished electric detonator is employed for the blasting down of coal in mining operations is illustrated, the purpose of the detonator being to explode the surrounding charge of dynamite.

This film is available to schools, churches, clubs, civic bodies and other organizations. No. charge is made for the loan of the film, the exhibitor being asked only to defray transportation charges. Copies of the film may be obtained by addressing the United States Bureau of Mines Experiment Station, Pittsburgh, Penn.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Allentown Portland Cement Co. (common)[22]	May 24	.....	1½	3	
Allentown Portland Cement Co. (6% bonds, 1932)[22]	May 24	.....	87	92	
Alpha Portland Cement Co. (common)[2] new stock	May 24	No par	38	40	37½c quar. Apr. 15
Alpha Portland Cement Co. (preferred)[2]	May 24	100	115	.....	1¾% quar. Mar. 1
American Lime and Stone Co. (7% bonds, 1942)[22]	May 24	.....	97	101	
Arundel Corporation (sand and gravel—new stock)	May 25	No par	36	36¾	50c April 1
Atlantic Gypsum Products Corp. (1st 6's carrying 10 sh. com.)[10]	May 26	.....	118	121	
Atlas Portland Cement Co. (common)[2]	May 24	No par	42	43½	50c qu. March 1
Atlas Portland Cement Co. (preferred)	.....	100	.....	.....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)[2]	May 24	33⅓	43	.....	2% quar. Apr. 1
Beaver Portland Cement Co. (1st Mort. 7's)[8]	July 29	100	100	100	
Bessemer Limestone and Cement Co. (Class A)[4]	Apr. 8	.....	34	34¾	75c quar. May 1
Bessemer Limestone and Cement Co. (6½% bonds)[4]	Apr. 8	.....	99	100	
Boston Sand and Gravel Co. (common)	May 21	100	70	.....	1% qu., 2% ex. Jan. 1
Boston Sand and Gravel Co. (preferred)	May 21	.....	.....	85	1¾% quar. Jan. 1
Boston Sand and Gravel Co. (1st preferred)	May 21	.....	.....	90	2% quar. Jan. 1
Canada Cement Co., Ltd. (common)	May 25	100	151⅜	153	1¾% April 16
Canada Cement Co., Ltd. (preferred)[11]	May 21	100	118½	120	1¾% quar. May 16
Canada Cement Co., Ltd. (1st 6's, 1929)[11]	May 21	.....	101¼	102½	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11]	May 21	100	95	99	
Charles Warner Co. (lime, crushed stone, sand and gravel)	May 20	No par	24½	.....	50c Apr. 11
Charles Warner Co. (preferred)	May 20	100	104½	.....	1¾% quar. Apr. 28
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929[16]	May 20	100	101¼	103½	
Cleveland Stone Co. (new stock)	May 11	.....	49	49	50c qu. June 15
Connecticut Quarries Co. (1st Mortgage 7% bonds)[17]	May 20	100	105	.....	
Consolidated Cement Corp. (1st Mort., 6½s, series A)[24]	May 26	100	97	99	
Consolidated Cement Corp. (5 yr. 6½% gold notes)[24]	May 26	100	96	100	
Consumers Rock and Gravel Co. (1st Mort. 7s)[18]	May 20	100	99½	101½	
Coosa Portland Cement Co. (6% bonds, 1944)[32]	May 24	.....	70	.....	
Coplay Portland Cement Co. (6% bonds, 1941)[22]	May 24	.....	88	.....	
Dewey Portland Cement Co. (1st mort. 6's 1942)[30]	May 26	100	99	101	
Dolese and Shepard Co. (crushed stone)[7]	May 25	50	96	99	$1.50 Jan. 1, $1.50 ex. Jan. 1
Egyptian Portland Cement Co. 7% pfd.[21]	May 22	.....	85	95	1¾% quar. Oct. 1
Egyptian Portland Cement Co. (common)[21]	May 22	.....	5	7	40c quar. Oct. 1
Fredonia Portland Cement Co. (6½% bonds, 1940)[32]	May 24	.....	97	101	
Giant Portland Cement Co. (common)[2]	May 24	50	55	65	
Giant Portland Cement Co. (preferred)[25]	May 24	50	44	48	3½% and 19% ex. Dec. 15
Ideal Cement Co. (common)	May 25	No par	82	84	$1 quar., $1 ex. Dec. 15
Ideal Cement Co. (preferred)[33]	May 23	100	111	112½	1¾% quar. Dec. 15
International Cement Corporation (common)	May 25	No par	63⅛	63½	$1 quar. June 30
International Cement Corporation (preferred)[2]	May 25	100	108½	110	1¾% quar. June 30
Kelley Island Lime and Transport Co.	May 11	100	135	137	$2 quar. April 1
Lawrence Portland Cement Co.[2]	May 21	100	97	101	2% quar.
Lehigh Portland Cement Co.[6]	May 24	50	118	123	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1928 to 1931)[13]	May 21	100	98	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1932 to 1935)[13]	May 21	100	96½	99	
Marblehead Lime Co. (1st Mort. 7's)[14]	May 20	100	100	.....	
Marblehead Lime Co. (5½% notes)[14]	May 20	100	98	.....	
Michigan Limestone and Chemical Co. (common)[6]	May 24	.....	26	28	
Michigan Limestone and Chemical Co. (preferred)[6]	May 24	.....	24	26	1¾% quar. July 15
Missouri Portland Cement Co.	May 11	25	44	45	50c May 1
Monolith Portland Cement Co. (common)[9]	May 19	.....	12½	12¾	8% ann. Jan. 2
Monolith Portland Cement Co. (units)[9]	May 19	.....	31½	32	
Monolith Portland Cement Co. (preferred)[9]	May 19	.....	9½	9¾	
National Gypsum Co. (common)[35]	May 26	.....	50	51	
National Gypsum Co. (preferred)[35]	May 26	.....	81	83	
Nazareth Cement Co.[20]	May 20	No par	30	32	75c quar. Apr. 1
Newaygo Portland Cement Co.[1]	May 20	.....	111	115	
Newaygo Portland Cement Co. (6½% bonds, 1938)[32]	May 24	.....	100	102	
New England Lime Co. (Series A, preferred)[14]	May 20	100	95	.....	
New England Lime Co. (Series B, preferred)[22]	May 23	100	95	97	
New England Lime Co. (V.T.C.)[22]	May 23	.....	33	36	
New England Lime Co. (6s, 1935)[14]	May 20	100	99	101	
New York Trap Rock Corp. (6% bonds, 1946)[32]	May 25	.....	98½	98½	
North American Cement Corp. 6½s 1940 (with warrants)	May 25	100	92½	93	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[32]	Apr. 26	.....	62	67	2 mo. period at rate of 7%
North American Cement Corp. (common)[19]	Apr. 9	.....	8⅛	9	
North American Cement Corp. (preferred)	Apr. 25	.....	.....	.....	1.75 quar. May 2
North Shore Material Co. (1st Mort. 6's)[16]	May 26	100	98½	100	
Pacific Portland Cement Co., Consolidated[5]	May 19	100	61¾	74	25c mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5]	May 19	100	97½	.....	3% semi-annual Oct. 15
Peerless Portland Cement Co.[1]	May 20	10	4½	5¼	
Pennsylvania-Dixie Cement Corp. (1st Mort. 6's)[29]	May 26	100	100	100¼	
Pennsylvania-Dixie Cement Corp. (preferred)[29]	May 26	100	99¼	99¼	1¾% March 15
Pennsylvania-Dixie Cement Corp. (common)[29]	May 25	.....	36¼	36½	80c April 1
Petoskey Portland Cement Co.[1]	May 25	10	10½	11¼	1½% quar.
Pittsfield Lime and Stone Co.[31]	Apr. 26	.....	.....	100	
Pittsfield Lime and Stone Co.[31] (common)	Feb. 25	.....	.....	25	

(CONTINUED ON PAGE 68)

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee, Higginson & Co., Boston and Chicago. [11]Nesbitt, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson Jr. Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago.

Editorial Comment

Has the National Lime Association taken a forward step or put one foot in the grave? Who can say now?

Interment or Re-Birth?

Opinion in the lime industry seems to be divided, and prophecy is neither popular nor helpful—we might even add, healthful, at this stage of the proceedings. The question which has divided the members of the National Lime Association is as old as organized human endeavor—strong centralization vs. a confederation of territorial groups, whose interests may be considered to have more in common than the relations of competitors in a national unit. It is the same old "state's right" controversy over which our forefathers spilt much of each other's blood.

Lime is a difficult commodity to promote because there are numerous varieties of lime; and numerous and very different kinds of markets consume lime. Nevertheless the problem of promoting the use of lime in a national way is not an impossible task, if we can learn anything from the experience of other industries.

In the first place we do not believe that there need be 57 varieties of lime. It is true that every limestone has peculiar characteristics which are transmitted in more or less degree to the lime made from it, and that it is to the individual lime manufacturer's advantage to capitalize these peculiarities, or special virtues, if such they are, if he can. Nevertheless it is also to his advantage and very much to the advantage of the industry as a whole to find out what are real virtues in lime and what are not.

There never was a product (or an animal or a vegetable) so complicated that its characteristics could not be catalogued and classified—and *standardized*. That does not mean that all lime can be made to fall under one classification, specification or standard, but it does mean that with a reasonable number of standards all lime may be given a definite classification or rating for whatsoever purpose it may be called upon to fill.

Various standard specifications for lime for certain construction and industrial uses have already been proposed, and some adopted, by the American Society for Testing Materials and the U. S. Bureau of Standards. These are good beginnings and all right so far as they go; but there must be generalization or grouping of these specifications into as few as possible standards. Until that time the lime industry will be chaotic and its own worst enemy.

We do not believe that the situation is one bit more complicated than is that of the lumber industry. There is a vast variety of lumber, numerous group associations of special interests (some naturally territorial), each more or less competitive with every other group, yet this industry has found enough in common to work together to raise millions of dollars for research and promotion of lumber.

There is no good reason why the lime industry should not support group organizations of producers whose primary interest is in finishing hydrate; or whose primary interest is chemical lime; or plaster lime, or lime for some other special use. Some of the interests of these groups may conflict, as, for example, finishing hydrate vs. finishing lime, or lime putty; but certainly there are mutual interests and there is more to be gained by such competitors in working under a common standard co-operatively than in condemning and fighting each other's material, which in the last analysis is only a variety of their own. The whole history of industry shows that to be the surest way of throwing the business to a progressive competitor in another industry.

There are some lime manufacturers who believe the same arguments apply to strictly territorial groups of producers. Whether they do or not remains to be seen. Certainly it is within the range of possibilities that a confederation of territorial groups can make a useful national organization. All things are possible to wise and patient men. The experiment is interesting, and will perhaps prove valuable in forwarding our knowledge of the trade association development in Amercan industry. We hope it will not prove too costly to the lime industry.

We have reported the proceedings of the convention at some length in order that every lime manufacturer and every prospective lime manufacturer may have a true and adequate picture of the present status of the industry. And he is blind indeed who, having read and contemplated the present crisis in his industry, does not take immediate action to join hands with his nearest competitors to see what steps are necessary to re-establish the industry on a plane that both its antiquity and its economic importance justify. The only way left open to do this is by a confederation of district group organizations, which at least is worthy of a fair and honest trial. It should not be forgotten that our own United States federal government evolved from just such a federation, and it may be that it is an absolutely necessary step in the evolution of a strong central authority made up primarily of selfish local interests. In any event it is no time for recrimination. Also it would seem logical to conclude that men who cannot co-operate on a small scale in group organizations are not ready to co-operate on a national scale.

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS (Continued)

Stock	Date	Par	Price Bid	Price Asked	Dividend Rate
Riverside Portland Cement Co.	May 9	.....	165	.....	
Rockland and Rockport Lime Corp. (1st preferred)[24]	May 11	100	103	.....	3½% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (2nd preferred)[24]	May 21	100	60	.....	3% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (common)[24]	May 21	No par	50	55	1½% quar. Nov. 2
Sandusky Cement Co. (common)[1]	May 11	100	125	135	$2 qu. April 1
Santa Cruz Portland Cement Co. (bonds)[8]	May 21	.....	106	107	o% annual
Santa Cruz Portland Cement Co. (common)[8]	May 21	.....	85	92	$1 quar., $1 ex. Jan. 1
Schumacher Wallboard Corp. (common)	Mar. 26	.....	27¼	27¾	
Schumacher Wallboard Corp. (preferred)	Mar. 26	.....	27¾	.....	
Southwestern Portland Cement Co. (units)	May 11	.....	205	.....	
Superior Portland Cement, Inc. (Class A)[20]	May 20	.....	43¾	44¼	
Superior Portland Cement, Inc. (Class B)[20]	May 20	.....	21½	22½	
United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27]	May 20	100	98	100	
United Fuel and Supply Co. (sand and gravel) 6% gold notes[27]	May 7	100	98	100	
United States Gypsum Co. (common)	May 25	20	96	97	40c quar. June 30
United States Gypsum Co. (preferred)	May 25	100	122	122	1¾% quar. June 30
Universal Gypsum Co. (common)[3]	May 25	No par	8	9	
Universal Gypsum V.T.C.[3]	May 26	No par	8½	9	
Universal Gypsum Co. (preferred)[3]	Nov. 23	.....	73	77	1½% Feb. 15
Universal Gypsum and Lime Co. (1st 6's, 1946)[3]	May 26	100	.....	96	
Union Rock Co. (7% serial gold bonds)[18]	May 20	.....	99½	101½	
Upper Hudson Stone Co. (1st 6's, 1951)[22]	May 24	.....	93	.....	
Upper Hudson Stone Co. (1st 6's, 1937)[22]	May 24	.....	104	.....	
Vulcanite Portland Cement Co. (7½% bonds, 1943)[32]	May 24	100	98½	101	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940)[15]	May 26	100	99	.....	
Wolverine Portland Cement Co.	May 25	10	5¼	5¾	15c quar. May 16
Yosemite Portland Cement Co.	May 11	.....	7½	.....	

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price bid	Price asked	Dividend rate
Atlanta Shope Brick and Tile Co.[1]	Nov. 24	.....	25c	.....	
Benedict Stone Corp. (cast-stone) (50 sh. pfd. and 390 sh. com.)[1]	Dec. 29	.....	$400 for the lot	.....	
Blue Stone Quarry (60 shares)[2]	Mar. 16	.....	$10¼ for the lot	.....	
Coplay Cement Mfg. Co. (common) (4)	Dec. 16	.....	12½	.....	
Coplay Cement Mfg. Co. (preferred) (4)	Dec. 30	.....	70	.....	
Eastern Brick Corp. 7% cu. pfd.) (4)	Dec. 9	10	40c	.....	
Eastern Brick Corp. (sand lime brick) (common) (4)	Dec. 9	10	40c	.....	
Edison Portland Cement Co. (common)[4]	Sept. 11	50	20c	.....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	.....	
International Portland Cement Co., Ltd. (preferred)	Mar. 1	.....	30	45	
Globe Phospate Co. ($10,000 1st mtg. bonds, $169.80 per $1000 paid on prin.)	Dec. 22	.....	$50 for the lot	.....	
Iroquois Sand & Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.) (4)	Mar. 17	.....	$12 for the lot	.....	
Limestone Products Corp. (150 sh. pfd., $50 par, and 150 sh. com., no par)	Dec. 22	.....	$60 for the lot	.....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	.....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co. (g)	Oct. 13	.....	.....	£1¾	
Phosphate Mining Co. (1)	Nov. 24	.....	1	.....	
River Feldspar and Milling Co. (50 sh. com. and 50 sh. pfd.) (1)	June 23	.....	$200 for the lot		
Rockport Granite Co. (1st 6's, 1934)[2]	Aug. 31	.....	90	.....	
Simbroco Stone Co.[2]	Apr. 20	.....	12	12	
Southern Phosphate Corp.[6]	Sept. 15	.....	1¼	.....	
Tidewater Portland Cement Co. (3000 sh. com.)	Dec. 22	.....	$6525 for the lot	.....	
Vermont Milling Products Co. (slate granules) 22 sh. com. and 12 sh. pfd. (5)	Nov. 3	.....	$1 for the lot	.....	
Wabash Portland Cement Co.[1]	Aug. 3	50	60	100	
Winchester Brick Co. (preferred) (sand lime brick) (4)	Dec. 16	.....	10c	.....	

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day and Co., Boston. (3) Price obtained at auction by Weilepp-Bruton and Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925. (6) Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass.

International-Lehigh Merger Rumored

MANY of the newspapers throughout the country are carrying announcements to the effect that a merger between the International Cement Corp. and the Lehigh Portland Cement Co. is in the making. One such announcement from the *Chicago* (Ill.) *Tribune* reads:

"Negotiations are in progress to bring about a consolidation of the Lehigh Portland Cement Co. and the International Portland Cement Co., according to rumors in financial circles. The Lehigh company is one of the largest producers of portland cement in the country, while the International is an important factor in the United States, as well as in some South American countries."

Whatever the outcome of these rumors, a glance at the stock prices of each company is enlightening. International no par common on May 11 (quotation from stock transactions on New York Exchange) closed at 53. At the time this issue goes to press, May 26, the price has advanced to 63⅛, a rise of over 10 points within two weeks. Lehigh stock sold at 117 asked and 115 bid on May 10 and advanced to 123 asked and 118 bid on May 24, a gain of about four points in the two weeks interim.

Other factors other than the merger rumor may have affected the International stock, such as the forthcoming second quarter report which is expected to show a ballance quite favorable.

Ability to meet foreign competition in the Eastern cities and favorable contracts from the Cuban government for cement are two points to account for the rise in International.

American Interests Seeking Control of National Cement Co. of Canada Rumored

ACCORDING to advice received from ROCK PRODUCTS' Canadian correspondent, strong rumors are afloat that American interests are seeking to purchase control of the National Cement Co., Montreal, Can. It is said that for some time past local interests have been at work collecting all available statistics and information regarding conditions in the cement business on behalf of a strong group of New York bankers, with the object of negotiations for the purchase of the company.

The financial interests mentioned are said to represent one of the most important cement consolidations in the United States and their ultimate object is to use the National Cement Co. as a nucleus for a much larger company, which would eventually erect plants in other parts of Canada. The present intention, it is stated, is to extend the business into the maritime provinces, Ontario, and the west by the erection of four new plants, making five in all.

Negotiations have not reached a stage where an announcement can be made as to the identity of the financial interests who are acting for the American cement people, but it is stated that they occupy a prominent position in the New York banking field.

The National Cement Co. produces about 3000 bbl. per day from a three-kiln dry-process plant at Montreal, East, Que. This plant, recently built, was described in ROCK PRODUCTS, January 9, 1926, issue. Joseph Versailles is president of the company.

New York Trap Rock Bonds Called

UNDER provision of the terms of the indenture, dated December 1, 1922, all the outstanding 5-year 7% gold notes of the New York Trap Rock Corp. (old company) maturing June 1, 1927, have been called for redemption at 102 and accrued interest. The Empire Trust Co., 120 Broadway, New York, has been named as redeeming agent.

Rock Products Plants in the Flooded Areas

Operations in Vicinity of Little Rock, Ark., Most Affected —Rehabilitation Started Immediately After Water Fell

By Edmund Shaw
Editor, Rock Products

ROCK products producers received more damage from the flood at Little Rock, Ark., than at any other place I have heard of, south of St. Louis. The highwater of the Mississippi, long continued, caused the Arkansas river to back up while it was at flood stage and there were heavy rains all over the state. One such rain was reported as having precipitated 8.88 in. in about 10 hr.

Probably the greatest loss measured in money was sustained by the Big Rock Stone and Materials Co. at its quarry on the north side of the river. But the Little Rock Sand and Material Co. suffered an almost total loss of plant and equipment. Its dredges and barges were sunk and the washing and screening plant was thrown into the river by the caving of the bank. This was a very neat and well designed sand plant with Telsmith screen and sand tanks. It was described in an editorial letter to ROCK PRODUCTS about a year ago.

The Big Rock stone crushing plant is on a narrow space of land between the high quartzite cliffs (which have been worked back to form the quarry face) and the river. This company has been in business for 25 years and this is the first time that the water has damaged the property. But the high water of this year and the current played mischief with the filled ground on which the tracks were located. The bank caved for a long distance, letting the tracks into the river, fortunately stopping before the long concrete wall that holds the storage was reached. The warehouse and office building was just saved and no more, for about a third of the concrete floor in the lower story fell into the river after being undermined by the current. The main plant building settled on the river side until the posts supporting it were perceptibly out of plumb, necessitating relining the shafts and machines in part of the building.

Water Rises Eight Feet Above Ground

The water rose about 8 ft. above the ground at the crushing plant and it brought in enough sand to bury everything about three feet deep. The motors and some other electrical equipment were pulled up as high as possible and were out of the way of the sand but not of the water. However, steam lines were run to them so that they were dried out and ready for service before some of the rest of the equipment.

Ben Dickinson, the manager, was just out

Washing plant of the Little Rock Sand and Materials Co., Little Rock, Ark., destroyed by the caving bank

Big Rock Stone and Materials Co. dredges and barges at Little Rock

What was left of the Missouri Pacific bridge near Little Rock

New tracks at the Big Rock company plant which replaced those washed into river

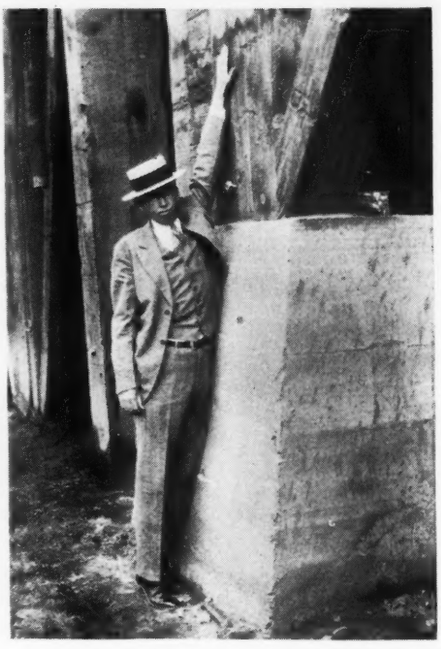
Sufficient sand was removed from the tracks of the Big Rock company plant to make the hill shown here

of the hospital and convalescing from a serious operation when all this happened. He found that all the plant tracks but one were broken by the caving of the banks and all the crushers and other machines on the lower floor of the plant had to be dug out, taken to pieces, the parts cleaned of sand and then assembled—and all of the track, not in the river, buried under three feet of sand. The astonishing part of the story is that with things in this condition the plant crushed and shipped 40 cars of crushed stone just seven days from the day the water was off the ground. Seeing what has been done, one would say that a month would be a more reasonable time in which to do the work.

Clearing Started at Once

Mr. Dickinson says it was done because he had a crew of good men, men who have been with the company for years, and who were ready to give all the cooperation and service their strength would permit. Undoubtedly they were good men, but there must have been some remarkable organization and leadership as well.

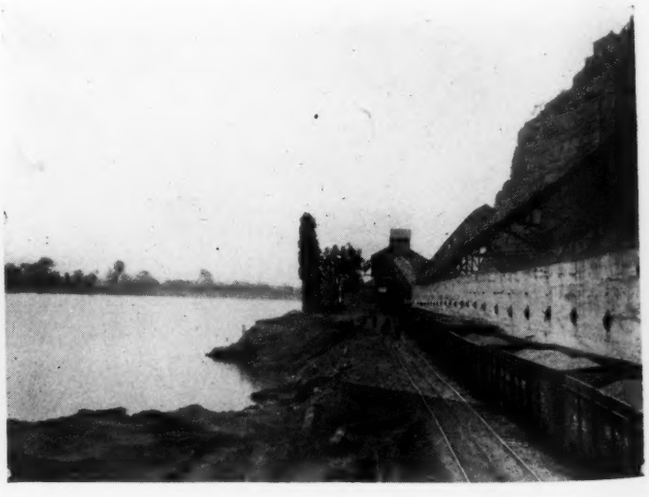
Just as soon as the water fell sufficiently, five contractor's shovels of the "Whirley" type were brought over from Little Rock and set to clearing the tracks. The sand was used for fills as far as possible. Broken rock was brought in from the quarry and dumped into the holes, needing it most. Fourteen thousand tons were put in one comparatively small cavity, which, however was 42 ft. deep. About 40,000 tons of broken rock were used in filling altogether. Work went on day and night and in the rain as well as in the sunshine. There wasn't much sunshine, for most of the time it was raining. And the plant went ahead with ever increasing production from the time it started. The morning I visited it, 17 cars had been crushed and loaded by 10:30 and it was expected that the day's production would pass 50 cars.



Ben Dickinson, manager of the Big Rock company plant pointing to the high water mark on the bin support

Sand Plant Little Damaged

This company also operates the largest sand and gravel plant in the Little Rock district, which is purchased from the Southern Sand and Materials Co. less than a year ago. All the material, which is principally sand, as this part of the Arkansas river contains almost no gravel, comes from the bed of the



Where the bank caved at the Big Rock plant. Note how close it came to the concrete wall which separates the storage piles from the railroad

Sand plant of the Big Rock company which was saved from the flood

Unloading barges at the Big Rock company's sand plant —the unloading station was under water for a time

river. It is pumped on to barges which are unloaded at the plant by a derrick emptying the buckets into a hopper over a belt running to the washing plant. Very little damage was done here, although the unloading station was under water and it took some hard work (day and night) to save this part of the plant and the floating equipment.

Near this plant is the municipal water works which newspaper readers may remember was saved from being put out of service by many days of hard labor. The Big Rock company sent its men over to aid in this work, as did all the other industrial concerns whose plants were near by. The company also placed its steamboats, barges and other floating equipment at the service of the government for rescue and protection work.

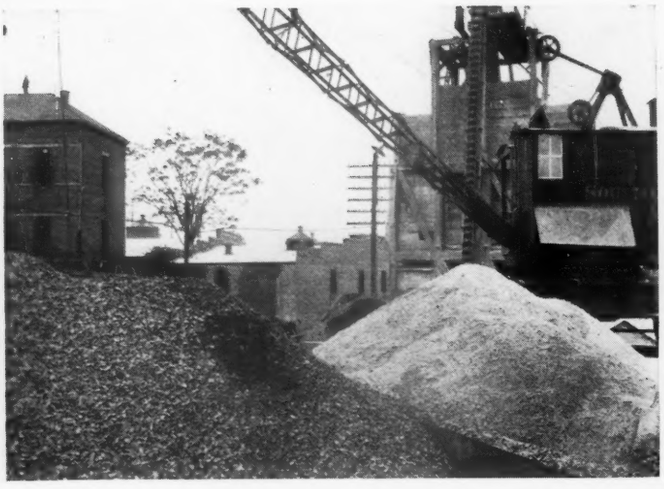
The bridge used by the Missouri Pacific railroad which crosses the Arkansas not far from this plant was loaded with coal cars when the water began to rise, but in spite of their weight about half the bridge went into the river. A curious echo of our financial conditions of a generation ago is found in the fact that this bridge belonged to an English company and was operated under lease by the railroad. The lease is to expire shortly so the bridge will not be rebuilt. A concrete structure will replace it, adding one more to the fine concrete bridges that already cross the river at Little Rock.

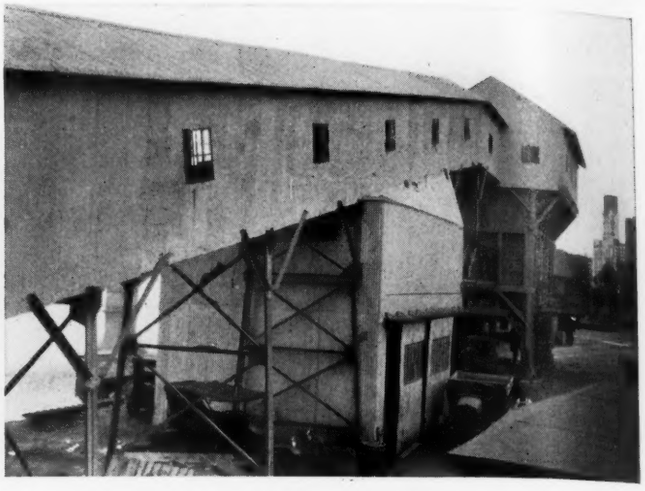
Caved ground and sinking buildings near the Big Rock company's sand plant

The Big Rock company has changed its business policy since it acquired the sand business mentioned and is now selling a very large share of its output either in dry batch form or as mixed concrete. It has put up a splendid distributing system at its yard at the foot of Ashley street on the river, with concrete bins into which barges are unloaded

Broken concrete floor in storehouse of the Big Rock company plant—the building almost went into the river

Workmen cleaning repair parts from storehouse—Everything in the plant had to be cleaned in this way





Wooden bins (left) and concrete bins (right) at the Big Rock Stone and Materials Co.

and bins with batchers, for loading out in quantity, which are filled by a conveying belt. The five batchers at the plant are of a type designed by Mr. Dickinson. They are placed under the bins so that a number of trucks may be loaded at the same time. The mixer concrete business is growing at a great rate. The present plant turns out about 100 yd. per day and is hardly able to keep up with the demand. A new steel frame plant is shortly to be erected which will have a 2-yd. and a 1-yd. mixer, making it possible to handle the largest jobs.

Dr. John Branner, Arkansas state geologist

The company has a fleet of 12 trucks for delivering materials and mixed concrete and of course it employs others. Mr. Dickinson says there is a great deal of satisfaction in selling concrete materials in dry batch or mixed form, because there is a far greater certainty that the materials will go into *good* concrete when this is done.

I did not go up to Benton but called at the Little Rock office of the Ball-Benton Gravel Co., where I was told the company's plant escaped with very little damage. One piece of plant track was washed away but none of the equipment was lost or even seriously damaged. The plant had to shut down for several days on account of the railroads being out of business but they are working as hard as they can now to supply the railroads with material. It may be remembered that this company specializes in washed gravel ballast which it ships long distances.

A Radio-Active Sand

Dr. John Branner, the state geologist of Arkansas gave me some interesting information about the progress of the rock products industries in the state. The most curious item was the production of a radio-active sand by the Whitlock Sand Co. at Whitlock Spur, near Benton. This sand contains about 0.1% uranium oxide and the radium which accompanies this mineral. There has been some actual production on which a severance tax has been paid to the state. This is one of those things that one is tempted to take with a grain of salt, but Dr. Branner assures me that it is to be taken seriously and that Dr. W. F. Menglesdorf, the chemist of the state agricultural bureau, has done a lot of investigating and believes that it is of real importance as a fertilizer.

As Arkansas has the best known bauxite deposits in the country, abundant limestone and cheap fuel (natural gas, petroleum and coal) it would seem an ideal place to manufacture high alumina cement, similar to that

Office and new truck loading plant, Big Rock Stone and Materials Co.

Trucks and batchers under new bins at the Big Rock Stone and Materials Co.

which is sold under the trade name of "Lumnite." Of course the cement manufacturers of the country have not overlooked such a situation and several of them have visited Little Rock and other points to investigate the possibilities of the business. So far none of them has reported that he intended to build a plant, but some of them have reported that they found difficulties in the way of building one. The bauxite deposits have no limestone near except one outcrop of a tertiary formation which is about 13 ft. thick and not sufficiently prospected to assure a sufficient area of even that thickness. Other limestone deposits are at least 100 miles away, the nearest being the Chalkey limestone at White Cliffs, now being worked by the Lime Products Co. The bauxite used for making high-alumina cement has to be very pure, with the processes at present in use. It should not contain more than 2% of silica. Such bauxite can be found in the Arkansas deposits, but is would have to be selected, which would make it expensive. A much higher silica content than this is permitted in aluminum ore.

The Lime Products Co. is grinding the White Cliffs chalk for whiting and promoting its use as an admixture for concrete. considerable testing work has been done and some sales are being made. The figures furnished by the Von Trump laboratory would indicate that it has something of a puzzolanic effect, increasing strength as well as plasticity. Tensile strengths from one test are:

	28 da.	3 mo.
Without admixture	448 lbs.	485 lbs.
With 10% hydrated lime	498 lbs.	528 lbs.
With 10% chalk	565 lbs.	593 lbs.

A number of other tests which were examined showed about the same ratio.

Notes of other plants that have been put in production since the visit paid to this locality a year ago are:

The Red River Crushed Stone Co. has a plant less than a year old crushing trap rock (quartzite) near St. Joe, Ark. John G. Wilson of the St. Joe Lime and Stone Co. is president of the company.

The Rock Island railroad has opened a quarry near Hot Springs where it is producing novaculite for ballast. Novaculite is a form of silica somewhat resembling flint, and whetstones are made from it.

Quarry operations at the Big Rock Stone and Materials Co.

V. A. Cordes (left) and C. Griffiths, president and superintendent, respectively, Wolf River Sand Co.

It is rumored on what seems good authority that a cement plant will shortly be built in the limestone region in the northern part of the state.

At Memphis, Tenn., Lee McCourt, manager of the Central Sand and Gravel Co., told me that the Greenville plant of this company had been damaged less than they had anticipated it would be. This was on May 14, and he had just received word that the plant was out of the water far enough so that they were trying to unload some barges of gravel. A hoist and an incline is used for that purpose at Greenville, and they were having trouble from the brakes on the hoist slipping because the machine was not quite out of water, but they were managing by running the engine in reverse. This is a fair illustration of the way people are getting back to work in the flooded area as fast as the water will let them.

At present the Greenville plant will take no orders, for it is putting all its efforts to supply what is needed to ballast and otherwise reconstruct the line of the Illinois Central railway which has been badly damaged in that part of Mississippi.

The dredge at the Greenville plant has been converted from steam drive to Diesel engine drive. A Fairbanks-Morse 240-hp. type Y engine is the power unit. It is mounted lengthwise of the hull, which is 130 ft. long and 30 ft. wide and the shaft of the engine is direct-connected to the pump

High water at the plant of the Wolf River Sand Co., Memphis, Tenn. The only damage was a wetting of equipment

Showing the height of the water at the Wolf River plant

Road to Wolf River sand plant under water

through a flexible coupling and a Cutler Hammer magnetic clutch. This same shaft is belted to a jack shaft on which are pulleys for driving the service pump of the engine, the priming pump and the generator and air compressor. The generator furnishes electricity for energizing the clutch driving motors and for charging a storage battery that supplies the lighting system when the engine is idle. A hoist in the rear, driven by a 30-hp. electric motor, handles the anchor lines. There are no spuds; the boat operates in water which is too deep for them.

The dredge at the Memphis plant of this company, now steam driven, is to be converted to Diesel drive in the same way. This dredge is now working night and day for orders are coming in very fast since the water began to fall. It is pumping in 75 ft. of water, which is the deepest working I have heard of for a pump dredge in the sand and gravel industry.

Flood Adds to Some Gravel Deposits

The river gives as well as takes away. The bar which this dredge is working appears to contain more gravel, with a smaller quantity of lignite, then it did before the high water came.

Two other producing companies which have plants at Memphis, the Missouri Portland Cement Co. and the Wolf River Sand Co., had trouble with high water and the Wolf River company produced nothing for 10 days. But the water was all backwater, without a current, and no more damage was done than what would come from wetting the machinery.

Although the business part of Memphis stands on clay hills which are high above the river, a part of the industrial section is on ground low enough to be submerged if the water passes the flood stage. The water used to back up through a bayou into the town but it is prevented now by a levee, and a pump which handles the seepage. However, the part of town where the sand and gravel plants stand does not have this protection.

V. A. Cordes, president of the Wolf River company told me that the company's plant at Madison, Ark., had been badly damaged by the high water and that they were only trying to get out a little ballast there at present. This is the plant that formerly belonged to "Uncle" Scott Bond, the negro who was born in slavery and who raised himself to be one of the principal business men of Arkansas. The older members of the National Sand and Gravel Association will remember him as he attended meetings of the association. He is well along in years and his health is reported to be failing fast.

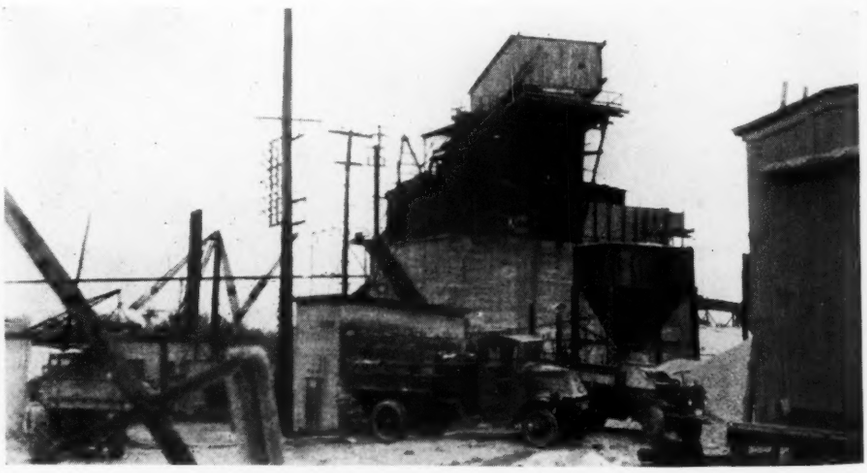
There is a new sand and gravel plant building in that locality by the Wynn Sand and Gravel Co. Wynn is about five miles from Madison and 50 miles from Memphis on the Missouri Pacific railroad. The gravel will be obtained from one of the deposits on Crowley's Ridge, which has furnished so much road material for Arkansas.

The Fischer Lime and Cement Co. (which owns the Central Sand and Gravel Co.) has a crushed stone plant near Williford, Ark., and this was under water for three days, although it is not near the big river. But Arkansas suffered from a combination of swollen rivers and heavy rains and every creek went out of its banks during the high water period. It was one of these little rivers (the Spring river) that flooded the Williford plant.

The Memphis Stone and Gravel Co., of which Walter Smith is manager had no trouble with high water this time, except that business fell off on account of high water conditions in other places. This company's plants near Paducah, Ky., and Iuka, Miss., are both too far from the Mississippi to be affected. But the Paducah plant was somewhat damaged by the January floods on the Ohio river.

This company produces only road material, a road gravel that has just the right amount and quality of binding material to make it pack hard under traffic. Under its trade name of "Tishowingo" gravel it is widely distributed. Many of the outlying streets and parkways are made of it, in some cases with a light dressing of oil or bituminous material that makes it ride like one of the regular bituminous types of highway. The bank is so solid it has to be well-drilled and shot like a quarry face before the steam shovels can load it. It is shipped to many points in the states along the Mississippi. Crushed stone of course is scarce in the Delta region, as this part of the coastal plain is called.

All the producers with whom I have talked say that business was slack in the early part of the season but now it is making up for it. It is certain that in and near the flooded areas of the states which have been visited an enormous quantity of cement and aggregate will be needed, not to speak of the lime and gypsum products that will be wanted for both construction and repairs.



Sand plant of the Missouri Portland Cement Co. at Memphis, Tenn.

National Lime Association to Reorganize as a Federation of Group Organizations

White Sulphur Springs Meeting a Rather Stormy Session of Representative Manufacturers

THE AMERICAN LIME INDUSTRY was not represented in numbers at the annual convention of the National Lime Association, White Sulphur Springs, W. Va., May 17 and 18. It was the smallest convention within recent years. Probably not more than 25 or 30 lime-manufacturing organizations were represented. Nevertheless the gathering was representative of the lime industry east of the Mississippi and Missouri Rivers, and those present probably represented an annual tonnage of well over 1,500,000 tons.

The board of directors of the association had previously decided on a program for the coming year, which eliminated all the research and field promotional activities of the association, with a cut in annual dues of over 80 %. In fact the program was already in effect and the Washington staff of the association dispersed. The board of directors at the White Sulphur meeting accepted this program with short discussion. At the general open meetings on May 16 and 17 the discussion was more in the nature of a post-mortem than otherwise, although a few manufacturers, notably William E. Carson, president of the Riverton Lime Co., Riverton, Va., fought valiantly and aggressively for a continuation of the former activities of the association.

President Warner's Address

Extracts from the opening address of Charles Warner, president of the National Lime Association; president of the Charles Warner Co. and the American Lime and Stone Co., Wilmington, Del., follow:

"This convention of our National Lime Association is planned on lines different from and broader than those of any gathering for many years past. It is different for the reason that we propose to concentrate exclusively on actual sales methods and sales promotion policies, believing this to be the outstanding need of our industry at this time. It is broader because we have decided, coincidently with planning for a change in association policy, to invite all manufacturers of lime products, regardless of membership, to join with us in discussing the outstanding needs of the industry. To this end invitations to this convention have been broadcasted to the manufacturers throughout the United States, and I trust that the industry during the sessions of the next two days will be fully represented.

"I am glad to welcome all of you in attendance at this opening session, and will ask for your earnest thought and active cooperation to assist in stimulating and developing discussion of ideas and experiences, so that we may carry home to our respective districts definite plans bearing upon the steps necessary to increase our sales of lime products.

Charles Warner

"While many have believed that the working policies of the national association in its effort to function broadly in behalf of the lime manufacturers, have been based on sound lines, yet it has been apparent at times that the association has lost some ground in maintaining the moral and financial support of a sufficient number of manufacturers to make its policies fully effective. The more nearly an association represents 100% of the manufacturers of the industry, the better it can serve the industry in the performance of those duties belonging to an associated effort. With a little less than 50% of the production capacity of the industry represented in our membership, it goes without saying that the possible effectiveness of our work has been seriously curtailed.

"I feel that so far as funds have permitted, and so far as thought and planning by your organization and your board of directors are concerned, the work has been well done; but since these efforts have not been supported, nor funds supplied, by over 50% of the productive capacity of the industry, the results have naturally appeared unsatisfactory at many times and in many directions. Our general manager's report to follow deserves the careful attention of all of you, as showing the character and extent of the work that has been under way until the curtailment caused by the directors' recent decision to recommend modifications to this convention.

Variety of Problems Baffling

"It is natural from the character of our industry that there should be 57 varieties of views as to proper methods of carrying on associated work due to the 157 varieties of limes and sales problems. It is a fundamental difficulty of our industry, combatting our efforts to promote it, that our products are manufactured directly from raw materials having diverse characteristics, without much opportunity to change these characteristics during the process of manufacture. Because of the varieties of products that feed into hundreds of different uses with their manifold specifications, and the numerous sales problems arising therefrom, it is easy to explain the 57 varieties of views that we encounter in our promotion work.

"Our associated experience in endeavoring to harmonize these views in many cases has developed extensive difficulties in promoting a centralized policy. Since sales promotion in its final analysis is the biggest problem in our industry, your board of directors a few months ago, after full discussion and voting on different phases of the question, finally reached the decision that the national work and supervision should be greatly reduced and simplified. Hence the directors recommend:

Scheme of Reorganization

"First: That the national dues, beginning with the new fiscal year July 1, 1927, be reduced to 1 c. per ton based on the total sales of lime products of the preceding calendar year, said dues to be paid in the

same method as heretofore, namely, one-twelfth thereof monthly.

"Second: That the organization be reduced to a general manager and such few employees as the new income will support for the purpose of clerical work at headquarters, and as much technical service from the office as may be possible.

"Third: That the organization continue to utilize for the benefit of the members the large amount of information and literature accumulated over many years of research, and the experience gained in our past extended association work. Much good in these directions can still be done by continuing the distribution of publications on a cost basis, by having reprints made of popular pamphlets that are constantly being called for, by answering the constant stream of inquiries on technical and semi-technical lines which flows into the headquarters office, and in such other ways as a limited organization of this kind may still continue to help the industry.

"Fourth: The fostering and assisting in the formation of district or group sales promotion efforts, particularly on the part of the general manager of the association, in order to carry out so far as possible that specific phase of the proposed new association policy designed to push actual sales and promotion efforts in every possible community where the manufacturers locally interested can be persuaded to energize themselves in their specific markets.

"In following out some of the policies above recommended, the National Lime Association can doubtless continue to do much good by reason of the strong potential position it has now secured as a result of the past few years of extensive and intensive efforts that have been put into this work. We have gained in potential position as a national body by reason of this work to an extent that many of us do not realize or appreciate. But those who have been more closely identified with the actual work under way during the past few years know that we have accumulated a great deal of value in our associated effort and that the 'fat' so accumulated can at this juncture be of great benefit in continuing to promote many phases of our industry work at much less expense than heretofore.

Must Have Greater Support From All Lime Manufacturers

"Many of us deplore the discontinuance of our national research work so far as the technical and laboratory efforts are concerned, and many of us will deeply regret the discontinuance of some active field work on the part of the national organization, which must be eliminated under the proposed new policy. On the other hand we must recognize that we must endeavor to bring into sympathy with the national association work a larger proportion of the lime producers of the United States, and that we must try to develop more common ground and collective effort among the lime manufacturers.

"At the moment, your directors believe that the more aggressive effort to form local and district groups and collectively promote the specific characters of lime in specific districts, constitutes the best plan to push forward the industry. Certain it is that in some way we must be pushing these various characters of lime to their various users more aggressively in order to increase the consumption of lime products as a whole, unless we are to confess defeat and permit our industry to start on the toboggan slide.

"I therefore again urge that the sessions of this convention be used to the utmost by all the manufacturers to determine the possibilities of group or district promotion efforts for the specific purpose of increasing the consumption of their particular grades of lime in their natural markets. It is argued that by this policy the groups or districts spending money in this fashion specifically for driving up tonnages in their natural markets should benefit proportionately from such expenditures. There is sound argument in this view and it only remains to be seen whether under such a plan as this a sufficient number of aggressive driving groups for the promotion of the various characters of lime in their local markets can be started up throughout the United States to bring about the broad and necessary result of substantially extending the national consumption of lime products.

Develop Local Group Activity

"The national organization in its proposed simplified form can assist such organizations to get under way, and our general manager, out of his broad fund of experience in these lines, should certainly be of help. The extensive records, pamphlets, etc., in the national office, either in their present form or as guides in preparing new literature needed to handle local problems, can likewise be of great help in carrying out this local work. But the success of the proposed policy must in the end rest almost entirely on the cooperative instincts and the will to act and to keep acting in this direction on the part of local groups of manufacturers having similar products and markets.

"While the development of many groups working in this fashion will cause conflicts in borderline uses and borderline territories, yet in the end if such work is intelligently and energetically pushed forward, it cannot but broadcast information in fruitful channels regarding the more extended use of lime and thereby help to increase its use. If such controversies are not too acrimonious, and are built on the principle of bringing out the good points of the specific limes being promoted instead of on the principle to too severely criticizing and condemning limes from adjoining districts that may be used for similar purposes, then such promotional activity cannot help but be beneficial in increasing the knowledge and use of lime.

Larger Expenditures for Promotion

"I feel that the situation in our marketing is such that we cannot as local producers expect to go back home to accomplish any good in this direction by a relatively small expenditure of 4 or 5 c. a ton, or by the assumption of arbitrary views by individuals in working out local or district plans of promotion. I feel quite confident that unless the various districts or groups are prepared to spend from 15 to 25 c. per ton on these new campaigns, and unless they will try to get together on a friendly give-and-take basis with their local fellow manufacturers, they will not be successful in extensively pushing their production into bigger tonnages.

"In my own district, coincident with reducing the national dues to 1 c. a ton, we are contemplating local promotion organizations on a budget basis that will involve about 25 c. a ton. If we expect to accomplish anything in meeting the present serious condition of overproduction, we must be prepared to 'take the bull by the horns' and spend money in adequate amounts in these directions. No other steps can possibly meet the situation and solve it with safety to the industry, whether we continue as numerous individual manufacturers or proceed in somewhat larger merged groups as may be the condition of tomorrow. Under any conditions, we must increase the consumption of lime, hence the reason for presenting these views forcefully in this preliminary statement of our industry's problem at the time of opening this convention.

All Industries Face Similar Problems

"The lime industry is not the only industry in this country that is facing a particularly hard and trying problem with a steady downward trend in its prices. There is a general downward trend in all commodity prices. But the rate at which this trend progresses, and its possible interruption for shorter or longer periods, is largely dependent upon the relation between consumption and productive capacity in each industry.

"As an industry, we have an entirely legal method of staying this trend by energetic field promotion of new uses and an enlargement of old uses of our product. We have full legal and moral rights to exercise collective effort in this character of promotion work, and unless it is done with great force we can expect the general downward trend in commodity prices to continue to affect lime prices. This downward trend in commodity prices has amounted to over 10% in the last fifteen months, and while the situation has varied in many lime districts and in the various

grades of lime, I should imagine that the average price trend in lime products during these same fifteen months has not been far off from the average general drops of 10%.

"I can only ask you whether you will decide to see this trend continue, or whether it is your intention by sales promotion campaigns to legally combat this downward trend. The situation can be handled only by you men and your fellow competitors in your districts, and its success rests almost entirely on the broadminded and liberal manner with which you will handle the subject assigned to you by this convention.

"In definitely relinquishing my duties as president at this convention, I wish to extend to you all my earnest appreciation and sincere thanks for the cooperation and support that has been extended to the administration by so many members. One of the greatest pleasures and privileges that ride along with a service of this kind to the industry is the opportunity for making delightful personal contacts through the helpful support which is received from so many fellow manufacturers.

"While finding it at many times a serious tax upon my time and energy to serve the industry in this position, yet I feel that during my various terms of office distributed over three periods of the past generation, I have gained a great deal in fellowship and in appreciation of the good to be found in others engaged in the same endeavors. This must be my last message to you and to the industry as president, and I can only hope that I have contributed some small measure of good in my efforts to push forward the welfare of the lime manufacturing industry of the United States."

Report of the General Manager

General Manager G. B. Arthur, of the national association, reported the status of the organization in part as follows:

"At present there are 68 members. Recently a list of responsible lime manufacturers was compiled with the help of members, with a total of 231, of whom 163 do not belong to the association.

"The contrast in the statement is modified when tonnage is considered. Our members report 1,811,303 tons as their average for the years 1923-1924. Subtracting this figure from the 4,074,121 tons which is the average of census reports for these years, there remain 2,262,818 tons for those manufacturers outside of the association. The average tonnage for our members is 26,638, while the average for these 163 non-members is 13,882. Probably 150 of these non-members make less than 15,000 tons of lime a year, and two-thirds of these do not exceed 5,000 tons a year.

Distribution of Lime Tonnage

"Some new figures on the distribution of the total tonnage of the lime industry indicate that in 1924 agriculture consumed about 245,000 tons, industries 1,680,000 tons, and construction fully 2,149,121 tons. The increase for construction in 1926 is expected to be even more striking, with a slight gain for industrial uses, and no gain for agriculture. A loss in agriculture will not be surprising. Together with these figures another significant statement has come from the Department of Commerce,

G. B. Arthur

to the effect that more than half of the money used in construction last year went into the small house classification.

Changes in Plan of Operation of the Association

"At the beginning of the year some work was still being done in research in general, and on 'Maxet' in particular. The conviction had been growing that the money of the association should be spent in channels which promised a more certain and more immediate return. Field work has been carried on in the central division with returns which were satisfactory for the money spent, and it was thought that a similar plan might be developed for other sections. Consequently, in the meeting of the board of directors at Atlantic City on October 21-22, 1926, it was definitely agreed to put all available money into field work.

"As quickly as the change could be effected one man was obtained for construction, and one for industrial work. Others were to be employed, but the shortening of our finances because of disturbances dictated a modification of the original plans. However, the increased force functioned for a few months with great benefit, and some of the high points in this work will be cited. These will cover both the national and central division forces.

"Salesmen's meetings were held in New York, Philadelphia, Kansas City, Minneapolis, Pittsfield, Mass., and Newark, N. J.

"The American Society for Testing Materials has approved the specifications for 'Lime Stucco,' 'Plaster' and 'Plastering Sand,' which we prepared with the help of the Bureau of Standards, the American Institute of Architects, the union plasterers of Chicago, and the contracting plasterers of Chicago.

"One of the notable events of the year was the change of the Portland Cement Association recommendations from high percentages of cement in mortar to the 50-50 cement-lime mixture. Also, this organization has stated in its schools held throughout the country, that if any admixture is desired in concrete, it should be hydrated lime. Both of these developments made our work easier.

"Through work with the technical men of the Common Brick Manufacturers' Association, they are about to recommend straight lime mortar where the loads do not exceed 100 lb. per sq. in., and 50-50 cement-lime mortar elsewhere.

"Work has been done on building codes in Kansas City, Chicago, Cincinnati, St. Louis, Philadelphia, and with the Pacific Coast Building Officials Conference.

"A brief on lime stucco submitted to the Building Department of San Diego brought about a change in the city ordinance by which gauged lime stucco is permitted along with portland cement stucco.

"Wacker Drive in Chicago was the outstanding concrete job of the year, and the use of lime throughout the structure has directed a lot of attention to our claims for lime in all kinds of concrete.

"In cooperation with the Portland Cement Association, the Metal Lath Manufacturers Association, the plaster contractors and the plasterers union of Chicago, a booth was built in the form of a Spanish house at the 'Own Your Own Home Show' there. Nothing but lime was used in the plaster and stucco, and the plasterers promoted high class plastering in all their propaganda, openly describing lime plaster as most desirable.

Lime in Highway Construction

"Several hundred thousand yards of concrete pavement and concrete base have been specified, using lime, in Wisconsin, Missouri, Arkansas, Ohio, Louisiana, Virginia and Iowa. Work with cities proved more profitable than with state highway departments, but several state departments will now allow lime, though they may not specify it. Delaware and Massachusetts specify lime in pavement concrete. Wisconsin and Indiana specify it in all bridges,

and several other states are considering similar action.

"In cooperation with the Asphalt Association, tests were made which prove the value of lime as a filler in asphalt mixtures, and their technical men wrote the foreword in our bulletin. The Asphalt Association has now written lime into its own specifications.

"Great interest is shown all over the country in our bulletin on the use of lime in earth roads, and it has had an unusual circulation. Further work on the project is being done by the University of Missouri, the University of Illinois, and Ohio State University. Several other interests are now supplying men and money in these investigations of treating earth roads.

"The three bulletins on highway uses of lime are in steady demand, and experiments are being made on all types by highway departments. Highway tonnage possibilities were helped very considerably by our booth at the American Road Builders Show, held in Chicago in January, 1927.

Lime in Water Treatment

"The steady growth of tonnage in water treatment continued throughout the Middle West, and extended in more volume into the Southeast. It was found that a considerable tonnage could be had in the New England territory with adequate field work when our propaganda was modified to meet the requirements of that field. Still more knowledge was obtained for refinements in the usual practices in the West, bringing a greater tonnage.

"Our limited industrial force in the field has come gradually to be a consulting force, and during the past year very little of what is called missionary work was possible. As members of the water committee of the American Railway Engineering Association and similar organizations, and by reason of well developed cooperation with consulting engineers, state health boards, and material or equipment people, there are more opportunities for work than we have been able to reach. A remedy for 'red water' was developed by our own force, and this has brought us a great deal of credit where it is in use. It is a modification of this that we expected to promote in the Eastern States.

Increasing Industrial Uses of Lime

"Three years ago we predicted new tonnage in connection with petroleum refining, based upon the success of the Zalondek process. While that process has not become successful, it turned the attention of refining men to lime for stopping corrosion. To-day every big operation is experimenting with lime for one purpose or another. Corrosion alone requires a half pound of lime for a barrel of oil, with an output for the oil industry of two million barrels a day.

"In such things as raw water ice manufacture, sand-lime brick, paint, paper and glue, we have done less than in other years, because the increase in demands for our time upon specific jobs has compelled us to specialize more.

"Three months' work in the metallurgical field shows a possible tonnage there as big as in any other field, and with the distinction of offering a far more cordial hearing than we have had in some industries. We did not get far enough to discover what the actual extent of this market is, but it is far greater than we had anticipated.

"State boards of health should be mentioned because we encounter them in connection with the work in almost every other direction. It may be said that the boards in half the states look upon the association as a safe advisor and consultant in trade wastes, water treatment, and in the handling of wastes in such industries as canneries and dairies.

"The lime industry received noteworthy recognition from the American Chemical Society when we were accorded three half-days in the recent meeting at Richmond for a 'Symposium on Lime.' The meeting was opened with an address by Mr. Warner, and later there was a paper by W. E. Carson. In all, 23 papers were read on various uses of lime, 20 of which were published in the May issue of *Industrial and Engineering Chemistry.*

Publicity Work

"Our publicity of the past year has aroused much favorable comment, and we have appeared as 'news' more consistently than any other association or building material. Space in special pages can be purchased or influenced, but space on the 'news' pages cannot. Sixty-five news releases have brought about 25,000 clippings, indicating acceptance by papers all over the country.

"There have been 38 trade paper releases, all of which were used. Also there were 37 special articles in trade papers. We find on checking up that each of these articles was reprinted at least twice, so that we have had about 150 articles in reliable periodicals.

"'Watertight Concrete' was rewritten during the year, and three new bulletins were published: 'The Fallacy of Unnecessary Strength,' 'Out of the Mud With Lime,' and 'The Value of Hydrated Lime in Asphalt Pavements.' There have been five issues of the 'Agricultural Lime News Bulletin,' and six 'Monthly Letters.' The proceedings of the last convention were printed in record time and there have been a number of smaller pieces of literature.

"We have attended the following meetings, with papers at some of them:

American Ceramic Society
American Chemical Society
Asphalt Paving Conference
American Road Show
American Society for Municipal Improvements
Indiana Sand and Gravel Association
Sand Lime Brick Association
National Sand and Gravel Association
North Atlantic States Highway Officials Association
Highway Research Board, National Research Council
Wisconsin Road School
Water Schools in Texas, Oklahoma, Kanasas, Iowa and Missouri
Water Works Association Sections in Illinois, Ohio, New England and Minnesota
Southwest Water Works Association
American Water Works Association
American Railway Engineering Association
Hoover's Committee on Wood Utilization
Gas Products Association
Management Week—Ohio State University
National Canners' Association
Paper Association
Sanitary Engineers' Conference
American Society for Testing Materials
Kansas City Engineers' Club
Stationary Engineers, Kansas City, Mo.

Adjustments for the New Plan of Operating

"The nature of the work which can be done under the new plan can be defined, but the scope of that work depends upon the income. The work will be set up under the following heads:

"(1) *INCREASING THE MEMBERSHIP*—Reviewing the figures read under finances, the 163 manufacturers who are not now members of the association offer a considerable field for work. Plans for acquainting these companies with the new plan of operating should be made at once, and this must be followed by personal work to bring them in. Experience has shown that the most effective way to induce people to join is through solicitation by members, because their consistent payment of dues is the best evidence of their conviction on the value of membership.

"(2) *GROUP PROMOTION*—It will be distinctly one of the important functions of the organization, whatever its size, to encourage the promotion of the product by groups. A survey must be made by the general management as early as possible to see where these groups can be organized, and to assist in all ways to bring such organization about. The men to be employed may be found by the association force, and they can be trained by the men in the association.

"These groups must be kept advised of all developments of interest and value; all literature and information upon various subjects must be put at their disposal; magazine articles and research work must be brought to their attention, and in general, the association must act as a clearing house for them.

"Still another and very important matter in this group promotion is the tying in of these groups on methods and policies, so that all groups will employ the same tactics, ethics and interpretations of research work, and thus maintain the unity of ac-

tion which is expected of a National Association. This brings along with it the matter of supervision of group work by the national office, and it is hoped that the discussion will bring out a definite opinion of the membership to guide our activities.

"(3) *LITERATURE AND SPECIFIC INFORMATION*—The accumulation of information through the last four or five years is important enough to have special mention. All of the bulletins must be kept moving, and it is assumed that the membership will desire no change in the methods by which they have been sent out. Under the new plan more literature will be required than before, for there will be more members using it.

"Aside from the literature there is the job of giving out specific information upon matters in all departments to fortfy the men in the group organizations, and to enable them to handle specific cases in such a manner as to conserve the standing of the association and get new business. As stated before, in reports to the board of directors and the membership, this information cannot be developed except by field work; by the demands of men in the field who are compelled to ask for specific information on the special cases which come up.

"(4) *DEPARTMENTS*—Taking up these subjects with reference to the departments which may be retained in the national office: (*a*) The general manager will have practically the same work as he has at present, but with added activities in some directions, and a change of attitude in others. It is particularly his work to increase the membership, working with the members in the several sections.

"Also, the encouragement of organization of groups for field work becomes a major concern. Others who may be retained in the organization will be available to foster this group and support it, but it must be started on a sound basis with funds assured, and with men well chosen and trained to do the actual work.

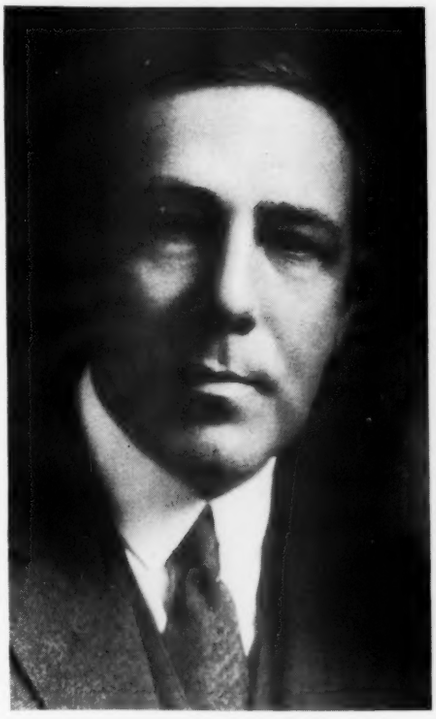
"The other problems which have been cited, such as literature, must be worked out as the groups organize and get to work, and the full scope of association work must be developed along these new lines.

Conclusion

"The year will close with the most cordial relations existing between the association and all other bodies which have allied or parallel interests. A very gratifying network of interest has been built up by careful work, and we have held informal conferences with representatives of building material associations in Washington with great benefit. In view of the change in plan of operating, the association has in these relations with other organizations assets probably exceeding all other things. Their conservation should be a matter of great concern."

General Discussion

The problems of promoting and selling lime were discussed fully in open sessions under ten subject headings. Each subject was handled by a representative producer, some by written papers, others extemporaneously. There was very little general discussion.



George B. Wood, elected regional vice-president

Same Man Promoting and Selling?

C. C. Schmoeller, Mississippi Lime and Material Co., Alton, Ill., gave his views in answer to the query, "Can promoting and selling be done by the same man?" He defined promotion as the creation of a demand that had not before existed; selling, the filling of a demand. He contended that while association field men had done good work, there was apt to be too long a lapse between the promoting and the call on the prospect by the lime manufacturer's salesman, giving the prospect too much opportunity to cool off. There is also too much opportunity for "buck passing" between the promotion man and the salesman, when the salesman fails to get the order. Hence it is desirable to have the promotion man do the selling. Mr. Schmoeller thought that if the company salesmen were supplied with the same ammunition the National Lime Association has supplied to its field men, they could promote and sell at the same time.

Variation in Promotion Methods

Geo. B. Wood, Rockland-Rockport Lime Corp., Rockland, Me., discussed "What variations in method must be recognized for promoting in the departments, or uses of lime—construction, industries, agriculture, and highways?" Mr. Wood said it was obviously impossible for an association field man to do anything but straight promotional work. The member companies must supplement his efforts with both their own promotion men and salesmen. He thought the promotion man and the salesmen should go together to create new business—the sale of the company's brand.

In the case of promoting lime in construction Mr. Wood could see little good in association field men calling on architects, engineers, or contractors. The lime manufacturer himself should have salesmen capable of doing that; the association has gathered enough data, facts and statistics on the use of lime in construction for every manufacturer to use to advantage and be his own promotional man.

The sale of lime for industrial uses, Mr. Wood said, is an entirely different problem; the lime producer is here selling the user, or consumer direct. To serve such a user adequately requires a chemical research man who knows his own lime and what it will do. A general field man for a group of producers is of very doubtful value, unless he is the technical research type of man.

For promoting the use of lime in agriculture Mr. Wood thought contact and cooperation with state agricultural authorities, county agents, etc., was sufficient. The promotion of the use of lime in highway construction, he said, was a special problem requiring different treatment in various districts or localities.

Milton McDermott, Knoxville Sand and Lime Co., Knoxville, Tenn., had to answer the query, "Will promotion by individual companies do any lasting good for the industry?" His answer, generally speaking, was "Yes." He gave various instances of individual work by the lime manufacturer with contractors in the promotion of hydrated lime in concrete, which are bound to help the entire lime industry. But, he said, the class of salesmen sent out by the average lime manufacturer to do sales promotion was a disgrace to the industry. What the industry needs, he said, is a high class technical sales force.

For promoting industrial uses of lime Mr. McDermott thought cooperative work by a group of manufacturers was preferable. To promote the use of agricultural lime the chief essential is high class company salesmen. The promotion of the use of lime in highway construction he thought could be done by the individual manufacturers.

For Group Organization

R. C. Bye, Charles Warner Co., Philadelphia, Penn., discussed the advantages of promotion by local groups of manufacturers (1) because there was no uniformity of market conditions for the industry as a national group; (2) it would bring together as many manufacturers

as possible, whose interests were the same; (3) a close district organization was absolutely essential; (4) the various groups could direct the activities of the national association to better advantage than individual members could.

S. W. Stauffer, J. E. Baker Co., York, Penn., argued for district grouping of manufacturers rather than national grouping; he said concerted effort was essential to the industry, and that organization by districts would not be a step backward, but a means of bringing order out of chaos in the lime industry. Such district organizations, he was sure, would and must have adequate supervision from the national headquarters, but this country as a whole was too big for the intimate contacts necessary for successful promotional work of a material so diverse in nature.

S. W. Stauffer, elected regional vice-president

Geo. J. Nicholson, Manistique Lime and Stone Co., Manistique, Mich., had for his subject: "Can national promotion be expected to serve all interests satisfactorily?" In substance his answer was "Yes"; provided lime manufacturers have an adequate comprehension of what constitutes legitimate association promotion work. He said such promotion must keep the prospect sold, as well as sell him in the first place. A national association must do the preliminary educational work; such work must be national in scope, and must furnish the material for district promotion efforts.

The purpose of national promotion work is to create interest. With the interest of the prospect aroused it is the function of the individual manufacturer to make the sales effort necessary for the actual sale. He said it was nothing short of tragic for the National Lime Association to abandon its promotional and research work at this time; that such work was a guarantee of prosperity; that vision and faith were needed. Mr. Nicholson gave instances of the friends won to the lime industry by the research department of the association, and again emphasized the shortsightedness of the industry in not continuing along the same lines.

Uses of Group Literature

J. M. Deely, Connecticut Lime Co., Lee, Mass., discussed "How can literature be financed under the group plan?" He said the answer depends on whether the literature is of a general or special kind. General literature he said could be financed on the usual plan, the individual manufacturers buying as much as they choose to distribute. The first step would be to get the various groups to agree on the kind of literature wanted, and to get guarantees to cover the cost. Special literature for a particular group could be prepared by that group independently, but the national association could handle the mechanical and clerical details of its publishing, and possibly help in the preparation. If such literature proved satisfactory for the use of other groups, and the permission of the first group was obtained, the other groups might obtain copies for distribution through the national association at a price that would yield the national association some profit. Mr. Deely criticized present promotional literature of the national association as too technical for use by the average salesman.

Charles Warner spoke briefly on the subject "How can groups agree on types, kinds and style of bulletins and other literature?" He said that by having the various groups working along such lines independently many new and helpful ideas should develop.

Group Competition?

J. J. Urschel, Woodville Lime Products Co., Woodville, Ohio, had the rather delicate subject, "Can a specialty group operate without friction with a market group operating in the same territory?" It is presumed this question was framed to sound out the sentiments of the Ohio finishing lime manufacturers, who have an independent association and distribute their products nationally in competition with local lime manufacturers.

Mr. Urschel defended his Ohio association and district, stating that these manufacturers had operated successfully for many years as a district group, and for a short time as a separate association. He did not want it referred to as a "specialty" group. He said the same methods and principles applied to any group organization. Confidence between manufacturers must be established; a policy of live and let live, he said.

Mr. Urschel was confident that differences between groups could be ironed out by a board of directors of the national association. A 100% cooperation or a 100% honesty in any business could not be expected. He said that a national organization in the industry was essential, but the plans for it could only be perfected by the districts.

Charles Warner spoke on another delicate subject: "Will the concentration upon any given territory by two market groups engender such rivalry as to make it easier for competitive materials to drive between them and take the business?" He said the problem must come down to common sense. He said there was, of course, a big risk of conflict and rivalry developing between districts. If this rivalry becomes knocking instead of constructive it will do the industry harm. There must be an ethical standard and quality standards to which all manufacturers who would survive must come. Higher standards, he said, would do away with mud-slinging.

What Is Competition?

S. M. Shallcross, American Lime and Stone Co., answered the following question so lucidly that his remarks are published complete:

"How can promotion men work closely enough with the salesmen to insure that the lime will be sold as it is promoted, without playing favorites with the members and without giving the appearance of playing favorites?

J. J. Urschel, elected regional vice-president

"Every individual, every manufacturing company, progresses so long as it follows economic law; as soon as economic law is run counter to, then the individual or manufacturing company loses out and will

exist only so long as its assets will last. Upon economic law must we, as individuals and manufacturers, base all our policies and actions. This is the fundamental law, the all-embracing law; it covers all forms of human and physical reactions; it embraces the law of the conservation of energy as well as the Golden Rule.

"In a recent issue of *Forbes Magazine* tucked off in a corner was a paragraph which deserved greater publicity. It stated: 'It's a pity private business is not as well, as fairly, as expeditiously managed as the business of the public service corporations. What a lot of villiany goes on in private business! How little, in comparison, in the public service corporations!'

"Why this difference between private business and public service corporations? The answer may be found in analyzing the forms of competition experienced by each.

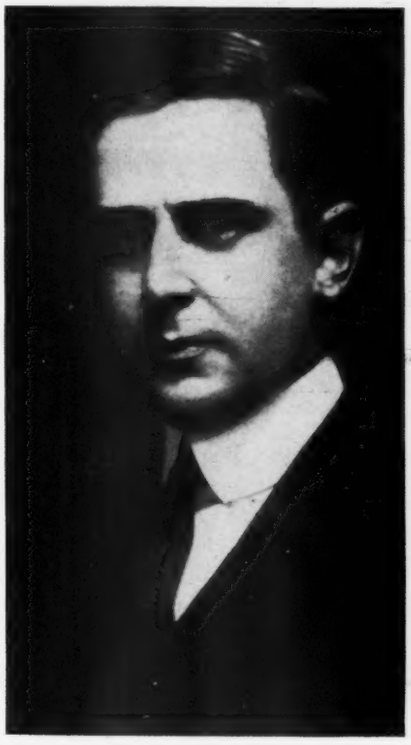
"The public service corporation has to combat but one form of competition, that of economic law. Within their territory, taking the case of power corporations, they must supply power cheaper than the isolated plants of the consumer. Only by economic manufacture and distribution of power can they hold their business or increase it. The lure of large profits does not blind them because their profits are limited by law.

"All types of industries have economic competition; like taxes, they cannot escape it. Also, like indirect taxes, the magnitude of economic competition is seldom realized. Its magnitude is many times greater than the competition between individual plants in a given industry. It is an irresistable force and, therefore, must be recognized. Every industry is threatened by it. For example:

1. *The coal industry:* The economic use of coal has curtailed enormously the growth, from the standpoint of tonnage, of this industry.
2. *The motor industry:* The development of a gas turbine or a Diesel engine adaptable to motor vehicles may revolutionize this industry.
3. *The phonograph industry:* The competition of radio instruments, undoubtedly, caused an enormous unknown loss to this industry, although it looks like the Victor company has found its economic position.
4. *Every chemical industry* faces the danger of having its major products become the by-product of another industry.
5. *The cement industry:* I have been told, but have not verified it, that only from 15% to 20% of portland cement has hydraulic properties. If it is true, then some invention may cause four out of five cement plants to become idle.

"While industry today is threatened on all sides by economic developments, we should not become panicky. The basic industries should be in a better position than processing industries and industries depending, in large part, upon patented machines and processes. Our lime industry is a basic industry, and therefore, we should have only optimism for the future. However, all our policies in manufacturing and distributing must be fundamentally sound or we fail. Cool heads must direct us in conformity with economic law.

"So far, we have confined our talk to economic law and economic competition in its broadest sense. As they are imper-



S. M. Shallcross

sonal subjects, so long as we confine our efforts to them, we will become an amicable family, like the public service corporations. There are other forms of competion which are personal in high degree, but which, nevertheless, must be faced. I have divided these additional forms of competition into two classes: (1) Competition between industries; (2) Competition within industries.

Competition Between Industries

"Competition between industries may or may not be economic. The use of steel rather than wood in large buildings is a necessity and, therefore, it would be futile for the lumberman's association to promote wood for that purpose. Usually the problem is more difficult. There is an economical balance between not only cost but also advantages.

"The evaluation of these two items in themselves is not easy, but to evaluate them together is in most cases impossible. Seldom will two men agree as to the probable erected cost of two competing materials. The advantages of different materials can seldom be priced in dollars and cents; and yet, in order to compare competing products, a common denominator for cost and advantages must be found, or the decision is made on sales argument. It is the function of the association promotion man to attempt to find the common denominator.

"The promotion man acts as a buffer and a leader in the struggle between industries. His work is actually disinterested, and if he were promoting an absolutely uniform commodity it would appear disinterested. However, where he is promoting a commodity of variable analyses and characteristics, his work will always appear partial. Actually, if he uses scientific methods, he should determine the best product for a given application and concentrate on promoting that product against the product of the competing industry. If he does not concentrate on the best product he is easily side-tracked from his main purpose and the presentation of his case is weakened, is unconvincing. Such a promotion man is a failure, as is likewise the industry which he represents. After the product is established, normal competition within the industry will give each company its share. Charges of partiality result from causes due to competition within the industry. We should be broad minded enough to ignore such charges.

Competition Within Industries

"Industrial economists tell us that prices are set by the marginal producers. That is, market prices equal the cost of the most inefficient producers. If this were true, we would have no failures. Market prices are located at a point below the cost of the most inefficient and above the cost of the most efficient. Our industry always has plants that are retrogressing. We continually have some plants that are progressing and some that are retrogressing. This is a self evident fact; we know there can be no standing still.

"The producers that are progressing are building for the future. They believe in national associations and promotion men. They are seldom the ones that advance charges of partiality, because they know that promotion men and themselves are working for the future, and they are ready to pledge all their resources for the future.

"What of plants that are retrogressing? For the good of the industry they should declare all cash received above operating cost as liquidating dividends and then scrap their plants. Some lime plant operators may recognize their situation and may have established a liquidating policy. If they have faced the facts, then naturally, they are not interested in promotional work and they cannot be blamed for wanting to get all the tonnage when they can.

"In discussing economic law and economic competition it is very easy to become confused by our own interests and go off on a tangent. Emerson has given us the classic parable of the man making mouse traps in the wilderness and the world laying a concrete road with ten per cent hydrated lime up to his door. Then

the advertisers upset our beautiful conception of economic law by stating that Emerson was wrong and that if he didn't advertise he would have to eat the by-product of his invention or starve. But Emerson is in good standing today, because with the development of radio, the advantages of the mouse trap were broadcasted at a cost of only $5,000 per hour and gas station sites are at a premium along that road today.

"Advertising and promotion are needed more today than ever before. Our lime association by continually advancing economic facts compelled the recognition of larger percentage lime mortar and the economic advantages of lime plaster over gypsum plaster. But the news of the reduction in our dues leaked out and was interpreted as meaning the dissolution of the Lime Association. Today competing industries are intimating that the dissolution of the Lime Association is evidence that our products are not fundamentally economically sound.

"Our products may be, economically, the best, but unless we compete in the promoting of them against the promotion of other products we run counter to an economic law, the survival of the fittest. Be sure of it, that every weakness shown by an industry will be pounced upon and turned to the advantage of another industry.

"Summing up—economic law is the fundamental law by which we grow or are destroyed. Our product or products must first be products that are economically sound. Our manufacturing and distributing policies must be economically sound policies. Anger and passion have no place in economic law. Those whom the Gods would destroy they first make mad, and the survival of the fittest are laws as prevalent and as necessary today as in the early years of human existence.

"Narrowing our discussion: Our competition with other industries must be met by our promotion men. Criticism of their work will be found to originate from narrow-mindedness, or in other words, from a retrogressing management.

"Finally: Our products may be fundamentally sound products; they may have great possibilities, but unless they are aggressively promoted, they will fall short of their possibilities.

E. C. Carter, Sheboygan Lime Works, Sheboygan, Wis., had the question to answer: "Should salesmen call on prospects with promotion men?" Mr. Carter said the salesman should not, when the promotion man was working for the association. All prospects uncovered by the association man should be reported to all the member companies. The association promotion man should be a technical expert, not a salesman. When a prospect was found by a member company salesman, the association promotion man should give the salesman all the assistance necessary to make the sale. When requested by a member company, under such conditions, the promotion man should accompany the salesman.

Promotion and Selling

J. M. Gager, Gager Lime and Manufacturing Co., Chattanooga, Tenn., his subject: "For the greatest good to the industry as a whole, emphasis must be given

John F. Pollock, elected regional vice-president

the idea 'sell somebody's lime.'. How can groups promote this idea, which implies that a member would rather sell a job for another member than have it lost to a competitive material?" Mr. Gager said that something was fundamentally wrong with the lime industry in not having held its markets in the construction field. Lime for chemical uses is all that has saved the industry. Now is the time, he said, to assume responsibility for doing something to win back the construction market. Everything should be done to sell lime even if the order went to a competitor.

Problems of Group Organization

W. A. Titus, Standard Lime and Stone Co., Fond du Lac, Wis., had the subject: "Should membership be permitted in any group organization without membership in the National Lime Association?" Mr. Titus answered this question categorically "Yes," because there is no conceivable way of controlling the action of local groups to the contrary. He said further that there was too much individualism left in the lime industry—an exception to the trend in industry generally.

Mr. Titus said the National Lime Association had done excellent work and should be continued, but selling lime was outside the province of a national organization; there are too many diverse conditions to be met; there is too long a time between promotion and sale; too much red tape. Group organization forms the natural solution of the problems, not necessarily grouping by kinds of lime manufactured, or market territories covered.

He said it was the duty of every lime manufacturer to help his competitor make lime more cheaply, more efficiently, that petty jealousies must be put aside for the common good of the industry. Group organizations gave producers the opportunity to meet more frequently and discuss such problems as cost, freight rates, ethics, production methods, etc.

Mr. Titus said it was an open question whether it is better to sell *any* lime in preference to a competitive material. He said it was best to try to raise the quality of lime generally to a definite standard that would be satisfactory for the purpose. He said the lime industry was at present too haphazard; chemists should be employed; a group of manufacturers could jointly employ a chemist where no single one of them could afford to.

The national organization, he thought, could function as a confederation of the various groups. The National Lime Association should provide leadership.

A. V. A. Felton, New England Lime Co., Pittsfield, Mass., answered the query: "If groups are to cite the national association as their head, will the national association set up a code of policies for these groups?", with a statement that the groups should cooperate; 47 varieties of lime; 47 varieties of groups, but they must cooperate!

W. E. Carson, Riverton Lime Co., Riverton, Va., the "father" of the National Lime Association, since for 30 years or more he did as much or more than any one else to keep it alive, was very emphatic in expressing his opinion of the change made in the organization of the lime industry. He said the National Lime Association had done far more good than was generally appreciated; that now was a momentous time; no time to pause in the work being done, but the time for even more intensive promotional work. He expressed no faith in the arguments that adequate promotional work can be done by group organizations. Before this can be done the various groups must be welded into a strong national association. Above all, he said, there must be standard qualities of lime recognized, and the acceptance of such a standard made obligatory to membership in the national association. He made an eloquent plea to utilize the present pause in the activities of the national association for a survey by technical experts of the lime industry to find out what steps were necessary to put it where it belongs.

Memorial to J. King McLanahan, Jr.

With the co-operation of every member of the National Lime Association William E. Carson prepared a beautifully bound volume of letters expressing the love and

esteem with which the late J. King McLanahan, president of the New England Lime Co., was regarded by all who knew him. This volume will be presented to Mr. McLanahan's daughter. Mr. Carson also delivered a memorial address which touched hearts and memories of all who knew "the senator," as he was universally known in the lime industry.

Entertainment

As usual the members and guests of the National Lime Association were royally entertained at a banquet tendered by the Valve Bag Co. of America, Toledo, Ohio. Carl Hartman presided as host.

Officers Elected

The convention decided to leave the selection of a president to the board of directors. The following regional vice-presidents were elected: J. M. Gager, Gager Lime and Manufacturing Co., Chattanooga, Tenn; Geo. B. Wood, Rockland-Rockport Lime Corp., Rockland, Me.; John F. Pollock, Ash Grove Lime and Portland Cement Co., Kansas City, Mo.; J. J. Urschel, Woodville Lime Products Co., Woodville, Ohio; S. W. Stauffer, J. E. Baker Co., York, Penna.

Limestone Products Company (Pennsylvania) Sold

DONAGHMORE COAL AND STONE CO., Lebanon, Penn., with general offices at Nos. 1218-44 Chestnut street and crushing plant at Donaghmore, has purchased the Limestone Product's Co.'s good will and entire plant, for many years known as the old Gloninger quarries, near the Fair Grounds, and for some time operated under the management of Elam Siegrist.

The Donaghmore company will operate the newly acquired plant on a larger production basis than hitherto. The combined outputs of the two operations is about 75,000 tons per year of dolomitic limestone, sold chiefly for road purposes.

The Donaghmore company is owned and operated by A. S. Craumer and his son, A. C. Craumer.—*Lebanon* (Penn.) *Report.*

Asbestos Corporation Plans Large Improvement

THE first annual meeting of Asbestos Corp., Ltd., held recently, was marked by interesting references by the president, W. G. Ross, to the various problems confronting the company, and improvements and changes which are being carried out to improve operating conditions on the different properties of the company. He stated that a policy has been adopted to first make expenditures on the more important properties acquired, with a view to improving the methods of treatment and operation and, where possible, consolidate operations. In itself, he said, this is not a simple proposition, because the various grades of mineral require different treatment. Machinery and methods suitable to one location would be entirely unsuitable in other parts.

Among the improvements being carried out are two additional 1400-ft. cableways at the King pit, the expenditure of a considerable amount of money on the Vimy-Ridge property, in completely changing the methods and machinery of the mill, which, it is hoped, will permit of producing a material differing in certain aspects from any now being produced or previously turned out under the old operations of this property. The mill will be in operation during the current year.

The most important undertaking being carried out is the joining of the Beaver pit and the Consolidated Mining Co.'s pit in the Thetford area, including the erection of an entirely new modern mill, large enough to handle the output of these two properties, at a cost of between $1,500,000 and $2,000,000. This will take from two to three years to complete.

The company's business, Mr. Ross said, was satisfactory, with conditions abroad showing a steady improvement. The company would not extend its operations into the manufacture of finished material, he stated, for the Canadian market was not sufficiently large to warrant this and tariff conditions did not permit of export to the United States. The cheap labor in foreign countries eliminated any possibility of competition in that direction, Mr. Ross said.

The board of directors, as presented by the three managing trustees, were as follows: W. G. Ross, William McMaster, H. J. Fuller, C. W. Colby, M. A., Ph. D., J. W. Cook, K. C., Beaudry Leman, W. C. Finley, H. E. Mitchell, Rt. Hon. Lord Shaughnessy.

American Road Builders Hold Installation of Officers

THE installation of officers of the American Road Builders Association was recently held at a banquet at the Mayflower hotel, Washington, D. C., which featured the annual meeting of the association. Charles M. Babcock, chairman of the Minnesota State Road Commission, was elected president to succeed Henry G. Shirley, chairman of the Virginia State Highway Commission. Other officers elected include Samuel Hill, Seattle; S. F. Beatty, Chicago; W. F. Van Duzer, Pennsylvania State Highway Commission, and S. H. Henry, Spruce Pines, N. C., vice-presidents; Miss Ethel A. Birchland, Westport, Conn., secretary, and James H. MacDonald, New Haven, Conn., treasurer. The following were elected to the board of directors: J. R. Draney, New York; Richard Hopkins, Troy, N. Y.; A. E. Horst, Rock Island, Ill.; T. A. Little, Kansas City, Mo., and Fred R. White, Des Moines, Iowa. Charles M. Upham, managing director of the association, was appointed chairman of a campaign committee for decreasing highway casualties.

Tentative plans for building many millions worth of good roads were discussed by the association, which hopes to see details completed at a congress of road officials, contractors and engineers, which it will sponsor in Cleveland, Ohio, in January, 1928.

Increased Demand for Road Materials in Vancouver

THE extensive highway construction program announced by the Canadian government together with the large amount authorized by bylaws that the various municipalities in Greater Vancouver intend to spend on hard surfacing as well as the opening up of new streets, and with the advent of more settled weather permitting outside construction to proceed, it looks like the demand for crushed rock as well as sand and gravel this season will considerably exceed that of previous years, states the Vancouver (B. C.) *Journal of Commerce.*

For the past 20 years all crushed rock used in Greater Vancouver, New Westminster and the lower mainland has been supplied mainly by two firms, Gilley Bros of New Westminster, and the Coast Quarries, Limited, of Vancouver. The combined capacity of these two plant is more than 1000-cu. yd. per day, while the demand for crushed rock since pre-war has averaged less than one-third this amount per day. As the chief demand for this material comes from roadwork, these firms are well equipped to meet all requirements in sight.

In line with general industrial expansion on the coast, both these companies have greatly increased their capacities and facilities for supplying crushed rock in quantities greatly in excess of present market requirements.

The local price of crushed rock is said to be considerably lower than prevails for this material elsewhere in Canada or the United States. This, of course, is largely due to the abundant supply of native granite of fine quality and the direct use of waterpower for operating the rock crushers.

As far as the sand and gravel supply is concerned, the combined capacity of the local firms in these lines is said to be greatly in excess of all possible future requirements for some years at least. Some of the firms engaged in production include the Cotton Co., B. C. Sand & Gravel Co., Champion & White, Fairview Sand & Gravel Co., G. R. Drysdale, McCleery & Weston, R. Main & Co., Deeks Gravel & Rock Co., Ltd., B. C. Contractors Supply Co., and the Producers' Rock & Gravel Co., the latter being a Victoria concern.

Many of these firms have recently increased the capacities of their plants and all of them are overhauling equipment.

Large Wisconsin Gravel Plant Goes Into Production

THE new sand and gravel plant near Gravel Island, Chippewa Falls, Wis., two and a half miles west of the river on the south side, erected by the Eau Claire Sand and Gravel Co., is reported to be completed and already in operation. The plant is said to be the largest in the state.

Highway material from a 207-acre farm owned and leased to the company by W. L. Tilton is being worked out. Tests are said to show that the gravel extends downward a distance of 150 ft. and averages 52% of the deposit material.

The plant is modernly equipped, all the work being done by electric power brought from Wissota dam through a transforming system from 13,000 volts to 440. An electrically operated dragline with a 3-yd. bucket conveys the material from the pit to the elevator where it is carried to the top of the screens. The oversize gravel is sent to the crusher where it is crushed and returned to the screen. The various sizes go to bins for out-loading on trucks or freight cars.

The washing of the material is done with water pumped from the river to the main building by two electric pumps having a capacity each of 750 g.p.m. All of the waste removed from the gravel is carried toward the river and dumped.

A sidetrack is located on either side of the screening plant and cars are loaded from 18 chutes. It was stated that when the plant is working to full capacity of 24 hours a day, upwards of 50 cars can be loaded. Information states that about 40 men will be employed in three shifts when the plant is operating full time, and also that the company may erect another plant equal in size and capacity to the one just completed, if the demand for sand and gravel warrants the improvement.

Already there are orders for a large amount of the product on hand, some to be shipped a considerable distance. A large amount is to be supplied for the concreting of highway 29 this year, it is said.

All equipment is run by electric motors, the dragline being operated by a 150-hp. electric motor.

Porter Company Electrifies Sand and Gravel Operation

THE Porter Construction Co. has just completed electrification of its sand and gravel plant on the Chiloquin road, Klamath Falls, Ore., preparatory to starting an expected busy season. The plant is located on a deposit of about 30 acres of sand and gravel which is being worked for building and concrete material.

The following account from the *Klamath Falls* (Ore.) *Herald* describes the operation in a somewhat humorous, non-technical, yet rather complete fashion:

"The plant is so arranged that Stephen W. Moss backs his 'Galluping Goose,' as he calls it, under the loading platform. There he works a system of levers and the sand or gravel slips into the Goose's back, several cubic yards making a load.

"Frank Holmes, the superintendent, then gives the high sign and Steve, acting as conductor, engineer and brakeman, starts the 'Galluping Goose' down a specially built railroad track for the Southern Pacific switch some distance away. He romps along the private track, making excellent time and sends his Goose up an incline where he again shifts some levers and the load is deposited in a railroad car ready to be transported to Klamath Falls, where the Porter company retails its product to the different contractors for building purposes.

"The plant is ready to produce about four carloads a day and throughout the summer season, with business now in sight, its continuous operation is assured.

"Louis Porter, head of the company, directs the work at the plant."

Intermountain States Plan Large Highway Improvements

THE intermountain states are starting this year on a highway building program far greater than any ever undertaken in any year past. As a group the states are starting out not only to complete construction on arterial highways, but to put feeder routes in as good shape as funds will permit. Figures on funds available in Utah, Wyoming, Nevada and Idaho show that these states will spend approximately $11,000,000 in construction and maintenance this year. The division is about $8,500,000 for new work and $2,500,000 for maintenance.—*Western Highway Builder.*

Fairfax Company Opens New Sand and Gravel Plant

THE Fairfax Sand and Crushed Stone Co., Clarksburg, W. Va., is reported to have recently completed a new sand and gravel plant at a cost of about $100,000. All modern equipment for the preparation of fine and coarse aggregate suitable for concrete, building and road work has been installed, according to the *Clarksburg* (W. Va.) *Telegram.* The new operation is said to be the only large commercial source for concrete sand in the district, the nearest plants being in Washington, D. C., in the east, and Pittsburgh and Ohio river companies in the north and west. It will probably market a good deal of its production in the adjacent counties, Mineral, Tinker, Grant and others.

The deposit worked by the company is locally known and has been utilized at various times for different road projects. The sand is said to be an almost pure silica sand, uniform in quality, sharp and quite suitable for plaster or concrete material. The stratum of sandstone on the deposit will be crushed for road materials, concrete aggregate and for other uses.

Neal Gravel Company Acquires Wabee Plant

THE Wabee Gravel Co. of Milford, Ind., in which John Kuert was the principal stockholder, is reported to have sold its plant and gravel properties southeast of Milford to the Neal Gravel Co. of Indianapolis. The consideration was $100,000. The Neal Gravel Co. is one of the largest sand and gravel producers in the country, operating seven other large gravel plants located in Indiana and Illinois. The company plans to operate the Kosciusko county plant day and night, adding new equipment to the plant, which already is considered one of the best equipped in Indiana.

The Wabee Gravel Co. was organized in 1924 upon acquisition of the Dexter gravel pit, with John Kuert as manager.—*Warsaw* (Ind.) *Tribune.*

Sunset Company Completes New Gravel Plant

COMPLETION of a modern $200,000 sand and crushed rock gravel plant in the San Fernando valley for the Sunset Rock Products Co., 326 Markham building, Hollywood, was announced recently in the *Los Angeles* (Calif.) *Journal of Commerce.*

The new plant has a capacity of 2000 tons daily. Storage capacity for gravel and sand is 40,000 tons. A concrete tunnel, 180 ft. long costing $25,000, has been constructed at the plant for the drying of sand. A fleet of 42 dump trucks is maintained.

Some interesting features have been incorporated in the design of the plant, particularly in the drying of the washed sand. The company plans to give both day and night service and has installed a service bureau whose chief duty is to make satisfied customers. Several men will be employed whose duties will be to follow up every job, handle complaints and look after the interests of the buyer after he has been sold materials.

Invitation has been extended to architects, contractors, builders and members of the general public to inspect the new plant, where guides are provided for the visitors.

Officers of the Sunset Rock Products Co. are: W. D. Fredericks, president; R. W. Clark, general manager; Judge W. H. Lyon, attorney; F. W. Clark, secretary-treasurer, and P. E. Woods, director.

Crescent Company Opens New Gravel Deposit

THE Crescent Gravel Co. of Hersey, Mich., has begun operation for the opening of a new gravel pit at Cases siding, one-half mile east of Beulah. Work has started on the grading of the new sidetrack to accommodate 75 cars when completed. The gravel, it is reported, will be purchased by the Wabash railroad for use in reballasting the right-of-way of the Ann Arbor railroad from Frankfort to Lake George.—*Grand Rapids* (Mich.) *Press.*

Progress at Florida Portland Cement Co. Plant

CONSIDERABLE progress is being made in the construction of the new cement mill of the Florida Portland Cement Co. at Hooker's Point, Fla. The steel framework of the power house has been completed and about half of the steel work is in place on the main storage building which extends 800 ft. along the plant's dock. Other buildings to be erected within the next few months include a coal supply building and a building over the discharge end of the kilns. About 400 workmen are now employed.

Most of this heavy machinery is already in place, including three rotary kilns and coolers, seven grinding mills, boilers, motors and power house equipment. Two turbines developing 5250 k.w.h. will be completed and put in operation soon, according to O. A. Hartley, superintendent of construction.

Work is now under way on all important units of the plant, Mr. Hartley said, with the exception of eight cement storage silos, which will be started shortly. Each of these will be 30 ft. in dia. and 80 ft. high. Eight concrete slurry tanks are now being built and workmen have started the erection of the plant's smoke stack, which will be 207 ft. high. This stack will rest on piling as will all other units of the plant.

The plant of the Florida Portland Cement Co. will turn out 1,500,000 bbl. of portland cement annually. The company will employ about 250 men, including 20 or 25 men at the company's rock and clay pits at Brooksville, from which 375,000 tons of raw material will be taken annually to keep the kilns running.—*Tampa* (Fla.) *Times.*

Large Kilns Shipped to Penn-Dixie Plant at Richard City

TWO of the world's largest cement kilns were recently shipped to the Richard City, Tenn., plant of the Pennsylvania-Dixie Cement Corp., says the *Dixie Manufacturer.* The kilns, each 10x11 ft. 3 in. diameter and 343 ft. 9 in. long, were made at the Reeves Bros. Co. plant at Birmingham, Ala. The kiln shells alone weighed about 600,000 lb. and required eight special flat cars to handle them. Supporting bases, gear bases and steel tires for the kilns were also made by the Reeves company and shipped separate. The total weight of each kiln, including operating equipment, is given at about 1,150,000 lb. The accompanying illustration, reproduced through the courtesy of the *Dixie Manufacturer,* shows the kiln shells on the cars at the shipping point.

These new kilns will replace in part some of the older short kilns at the Richard City plant. The old kilns, of which there are nine, are 9 ft. in dia. and 110 ft. long. The wet process of manufacture is used.

Canada Cement to Develop Antigonish, N. S., Gypsum Deposits

THE recent visit of Frank P. Jones, president of Canada Cement Co., to the gypsum areas in Antigonish county, N. S., recently acquired, is taken as an indication that a development of the new property will be carried out immediately. The company, it is said, is planning to spend about $500,000 on the gypsum areas. In a statement made during his visit, Mr. Jones declared that the gypsum deposits were exceptional and that large quantities would be shipped out next year, not only to Quebec and Ontario, but to the United States.

Plans of the company include the construction of a crushing plant at Antigonish, with two miles of railway to a new shipping pier that will be built this year. There will also be developed a power plant, with oil as fuel.

The markets for gypsum are dependent to a great extent on the cost of transportation. Canada Cement Co. already owns a large share in the Pennsylvania Gypsum Co., Chester, Penn., which stock was paid for during the past year. In the case of the Nova Scotia deposits the company is counting upon the advantage of being able to ship by water. This condition will be of great advantage in opening up markets along the St. Lawrence routes and the lakes, and getting it into the United States.

To Ask Protection for Cement

SINCE the close of the war the great building activity in the United States naturally has created a great demand for building materials. A well-maintained demand usually sustains prices, yet, in spite of the demand, the prices of certain classes of building materials have declined, and to such an extent as to menace some or all of the productive industries involved. Much of the explanation lies in the volume of imports of foreign materials at prices so low that the domestic producers cannot meet them.

Portland cement, which cuts a great figure in building operations, is now on the free list. Under the acts of 1897 and 1909 portland cement was dutiable at 8 cents per 100 lb., when imported in barrels, sacks or other packages, including the weight of the barrels or packages. When it was imported in bulk the duty was 7 cents per lb. Under the act of 1913, cement was placed on the free list. In 1924 there were imported 235,641 tons of cement free of duty, valued at $2,157,257. In 1926 the imports had increased to 506,743 tons, valued at $4,807,033.

Domestic producers of building materials of different classes are alarmed at the rapid increase of competitive foreign materials and have not only united to urge on builders the use of domestic materials, in place of those of foreign production, but are planning to ask that materials now on the free list be given protection, and that those now dutiable be given adequately protective rates of duty.—*Tariff Review* (New York).

Bessemer Company to Make Waterproof Cement

ACCORDING to a report in the *Wall Street News* (New York), the Bessemer Limestone and Cement Co., Youngstown, Ohio, who has acquired the manufacturing rights for Ohio, West Virginia, and portions of New York and Pennsylvania of an English super-cement with special waterproofing qualities.

The Bessemer Limestone and Cement Co. operates a 3-kiln, wet-process plant at Walford, Penn. L. A. Beeghly is president.

Sections of two of the largest kilns, recently shipped to the Richard City, Tenn., mill of the Pennsylvania-Dixie Cement Corp.

College Professor to Successful Gypsum Manufacturer to College Professor Again!

Dr. Frank A. Wilder Returns to Much Beloved Work After an Interesting Application of His Expert Geological and Technical Knowledge in the Development of a Great Industry

HAVING recently done some rather pointed "preaching" to the lime industry on the value of scientific knowledge and its application, it is pleasing to the editor to be able to refer to a shining example—to a man who has applied such knowledge to manufacturing problems in a rock products industry. Our example is Dr. Frank A. Wilder, recently president of the Southern Gypsum Co., North Holston, Va., whose scientific knowledge and attainments in his chosen field are second to none. His career is outstanding proof that such knowledge is not only practical but very useful in the accumulation of a fortune.

Like all true scientists, Dr. Wilder loves his science more than material things, and he has done what would have been expected of him by his intimates—returned to his first love—the noble profession of teaching science. Next fall Dr. Wilder will resume his duties as a professor of geology (at Grinnell College, Grinnell, Iowa) after a period of just 20 years, during which he was a most successful and progressive manufacturer of gypsum products. The Southern Gypsum Co., which he organized in 1907 with the help of an old college friend, Charles H. Ewing, he recently sold to the Beaver Products Co. for a reported price of close to a $1,000,000. (A description of the Southern Gypsum Co. plant was published in ROCK PRODUCTS, February 5, 1927.)

An Inspiring Career

Dr. Wilder's career is so interesting and so inspiring that the editor wishes he could give it in much more detail than what follows. It certainly should prove to all young men in the rock products industries, struggling to obtain an adequate scientific knowledge of these materials, that anything and everything they can acquire in geological and chemical knowledge may eventually prove to their advantage.

Frank A. Wilder was born at Akron, Ohio, February 2, 1870. As a boy he lived in Monroe, Mich. He graduated from Oberlin College (Oberlin, Ohio) in 1892, and studied the following year at Yale University, New Haven, Conn. This was followed by several years teaching at Fort Dodge, Iowa, as teacher of science at the local high-school. Incidentally he had occasion to study the gypsum deposits of Iowa, which even at that time were important.

After teaching at Fort Dodge, Mr. Wilder taught for three years in the West High School at Des Moines, Iowa, and later acted as assistant state geologist of Iowa. As such he began work on a geological report of Webster County, in which Fort Dodge with its gypsum deposits is located.

Frank A. Wilder

In order to increase his knowledge of gypsum Mr. Wilder went for a year of study to the old school of mines at Freiberg in Saxony, and there studied the German gypsum deposits and the manufacturing methods of that country.

Returning from Germany he studied at the University of Chicago, receiving the degree of Ph.D. there in 1902, taking as his thesis, "Age and Origin of the Gypsum Deposits of Webster County, Iowa."

After leaving Chicago University, Dr. Wilder acted as state geologist of North Dakota for a year, and then went to the University of Iowa and there held the chair in economic geology for three years.

After returning from Germany Dr. Wilder prepared a bibliography on gypsum and in the library of the University of Chicago ran across a book that indicated that there might be deposits of importance in southwest Virginia. Ths led to an investigation, followed by core drilling, and the deposits showed such possibilities that, taken with the freight differential, in favor of southwest Virginia for all the southeastern states, they led to the belief that the deposits justified development, and with the help of an old Oberlin and Yale friend, Charles H. Ewing, Dr. Wilder organized the Southern Gypsum Co., which for 20 years grew and prospered as did the gypsum industry of the United States as a whole.

Dr. Wilder is a member of several learned societies. He was married in 1898 to Mary Z. Welles and has three children, John, Charles and Virginia.

Alumni Pay Tribute

A tribute to Dr. Wilder in *The Oberlin Alumni Magazine* for December, 1926, by Dr. Florence M. Fitch, contained the following interesting information about his industrial activities:

In the western corner of Virginia, shut away from the outside world, is a spot called by its inhabitants "the happy valley." The northern branch of the Holston River winds its way through it; the foothills of the Allegheny mountains surround it, and behind them rise long, flat ranges, thickly wooded and cut down by tiny but swift streams. Here twenty years ago was a typical southern mountain community, with a few large homes of country gentlemen and the hillside shacks of the mountain people. Then an exploring geologist discovered that there were rich deposits of gypsum here, part of the only gypsum deposits in the South East. He recognized its commercial possibilities and interested others in the formation of the Southern Gypsum Company.

Today the visitor finds a flourishing industrial community with open quarry, mine, and mill, employing more than three hundred men and doing a large annual business. If he stays even a few hours, he discovers that this is no ordinary mining or milling town, but that here there has been a social achievement not less significant than the industrial.

It is a tribute to Dr. Wilder's ability and the attracting power of his personality that he has gathered a strong group of men as the directors of this company, who even though living at long distances meet quarterly to give first-hand consideration to its problems.

Mrs. Wilder has given herself unstintedly to her husband's work. In the early days she was called upon for first aid, to assist the doctor in cases of accidents and operations, to give care to the sick and dying through all the country side. On horseback where there are no roads, she has answered the cry of need from remote valleys. Her help has saved many a baby and mother; her patient training has been the first and only education in sanitation, home-making, and the training of children which many a woman has had, and now the results are seen in better homes throughout the region. She has been fearless in her denunciation of evil; she has been untiringly patient with the weak and sinning, working for years to save an individual or a family. She has interested county authorities and secured their cooperation in law-enforcement; she has inspired and organized volunteers for the help of the unfortunate. The pioneering has been done; social agencies are established; but Mrs. Wilder is still the guardian angel of the valley. Wherever she goes, men and women and children hurry to their gates to salute her and to hear her hearty greeting as she calls each by name.

In addition to the industrial plant, the company has built a branch railroad, requiring considerable engineering skill and large expenditure, a store, a school, a community house used also for church, a hospital, a hotel, primarily as a residence for the unmarried members of its staff and the teachers, and homes for its staff and employes. Each house has its garden plot, additional land is alloted to those who will cultivate it, and sheds are provided in each section where a cow and a pig for each family can be sheltered. All houses have electric lights and those that do not have running water have access to conveniently located wells. Rent and light cost about one-third as much as in the average town and workmen are helped to buy their own homes. Members of the staff are allowed to plan their houses which the company builds for them and rents to them or sells at cost. Wages are on a competitive basis with industries in the surrounding country but probably no other plant makes such generous provision for its men in other ways.

The Southern Gypsum Company pays the usual accident benefits and gives additional voluntary assistance when needed. It carries life insurance up to twelve hundred dollars for all of its employees, paying the entire premium. A local mutual insurance company has been organized with six workmen as directors, financed jointly by the company and the men. A reserve fund of $6000 has been built up, upon which, as upon all savings accounts of workmen, the company pays six per cent interest. In case of illness or accident a man may draw one hundred and fifty dollars; further loans are made if needed. This company also pays for regular dental service for the men and their families.

The gypsum company has a resident physician, one-fourth of whose time is paid for by the company, and a nurse who devotes her whole time to the workmen's families; it also provides all medicines required.

Paternalism is avoided by the fact that the entire community unites in the North Holston Christian Association, which through broadly representative committees directs all the social, religious, relief, health, athletic, temperance, music educational, and junior activities of the community. There is no church—for ecclesiastical organization in this section could not avoid denominational issues—but Sunday Schools are maintained in North Holston and in one of the outlying valleys and ministers of various denominations come for preaching services. A band is conducted by a neighboring musician and a chorus by the wife of one of the staff. Athletic teams play with those from surrounding towns and every one turns out for the games after working hours. Grounds for tennis and other informal sports are provided. Prizes are awarded for the best garden. The Christian Association and the Gypsum company each contribute one-fourth of the teachers' salaries, thus doubling the amount alloted by the state and county and so securing a nine-months school and better teachers. Such are a few of the many activities of the Association.

By such far-sighted statesmanship Dr. Wilder has gained the cooperation of his staff, is developing the initiative of his men, and is insuring the permanence of his work. The son of privilege and the son of generations of isolation, educated and ignorant, white and negro, northerner and southerner, work together in amity, because they have learned from him the spirit of his Master.

Contemporary Opinions on Efficiency of Cement Slurry Filtration

THE recent article on the filtering of cement slurry at the Ford Motor Co.'s cement plant, published in ROCK PRODUCTS, December 26, 1926, issue, has created considerable comment in this country and abroad. The *Tonindustrie-Zeitung,* one of the foremost rock products publications in Germany, has deemed it of sufficient importance to reprint the article entire in translated form with all the illustrations, along with a critical summary by A. B. Helbig, Berlin, Germany, cement mill engineer. In this criticism which follows, Mr. Helbig tells of some early work on reducing the moisture content of cement slurry. The comment follows:

Filters in the Cement Industry

By A. B. HELBIG
Consulting Engineer, Berlin, Germany

At the time of my entering the employment of the Hemmoor Portland Cement Co. in 1898 the mill was facing the problem of reducing the water content of the slurry by mechanical means or by heating, as the existing methods (slurry ponds exposed to the air) were inadequate due to increased production and a rainy summer. It developed that the five dryers put into operation, and the filter press were too costly, compared to former cost of operation. It was also established that the filtering efficiency of the filter cloths decreased rapidly due to our very finely divided raw materials.

German manufacturers have for years furnished rotary filters, whose use has been well tested out in chemical industries. I do not know whether these filters with cylindrical filter surface were ever used in the cement industry.

It is my personal opinion that any filter cloth is uneconomical for such materials, which are finely divided and clog the cloth. The successful application of rotary in the Ford Motor Co. cement plant, which reduce the water content of the slurry from 33-35% to 17-19%, can no doubt be ascribed to the physical properties of the limestone and the slag, which do not clog even in the most finely subdivided state, and permit thorough cleansing of the pores of the filter cloth. By using the dry process and utilizing waste heat, even greater economy could be achieved with these materials, the quality of the cement remaining unimpaired.

The fuel consumption of 112.35 lb. per 375 lb. barrel, i.e., of 30% for a slurry with 33-35% water of these materials cannot be considered as specially low.

Table 3 confirms my opinion, as the water content of the marl is here reduced from 65 to 40%. No doubt we deal here with dredged material, as all limestones form a good slurry with 40%. The very fine marl became watertight with 40% water.

Editorial note by *Tonindustrie-Zeitung:* The critical considerations of Helbig on the reduction of the water content of portland cement slurry by filtering are strongly contradicting the recommendations of the United Filter Corp. It would be of interest to hear further from our readers on the subject of application and relative success of up-to-date filtration plants in the cement industry.

Volcanic Ash Mined in Canada for Cleanser

ONE does not usually associate the prairie province of Saskatchewan with volcanoes, so it is surprising to learn that two western Canadian companies are canning "volcanic ash" in tin retainers to sell to housewives for scouring bathtubs and kitchen sinks. Yet the industry is not new.

In 1924 Canada used 245 tons of "native" volcanic ash, secured chiefly through production near the town of Swift Current, Sask. In 1925 nearly 300 tons were produced.

There are no live or sterile volcanoes amid the wheat fields. The deposits in the Swift Current district and elsewhere in Saskatchewan are sedimentary, a gift of the glacial movement or some other ancient benefactor of the Northwest. The greater part of the southern plains of Saskatchewan is underlain by flat, sedimentary rock, in which many non-metallic minerals are found. Among these is volcanic ash, in apparently unlimited supply. This ash was first discovered near Waldeck, Sask., just east of Swift Current. The deposits there are covered with a mantle of clay and drift, so that the extent is not known.

Other deposits of volcanic ash occur at Gull Lake, west of Swift Current; at Beachy, north of Swift Current, and near the South Saskatchewan River; and quite extensively in the Twelve Mile Lake valley near St. Victor in the Wood Mountain district. The only other deposits of volcanic ash to be found in Canada are in the Deadman River district of British Columbia. These have not yet been used for production.—*New York (N. Y.) Herald-Tribune.*

Portland Cement Output in April

Record Monthly Production — Shipments and Stocks Show Marked Increase

APRIL production and shipments of portland cement show increases, respectively, of nearly 13 and 11% over the corresponding period in 1926, according to the Bureau of Mines, Department of Commerce. Production was the highest for any April, and shipments were exceeded only in one other, April, 1925. Portland cement stocks at the end of April decreased slightly but are second only to those at the end of March and are over 4% greater than the stocks at the end of April, 1926.

The output of another new plant located in western Pennsylvania is included for the first time in these statistics, which are prepared by the division of mineral resources and statistics of the Bureau of Mines and are compiled from reports for April, 1927, received direct from all manufacturing plants except two, for which estimates are necessary on account of lack of returns.

Clinker Stocks

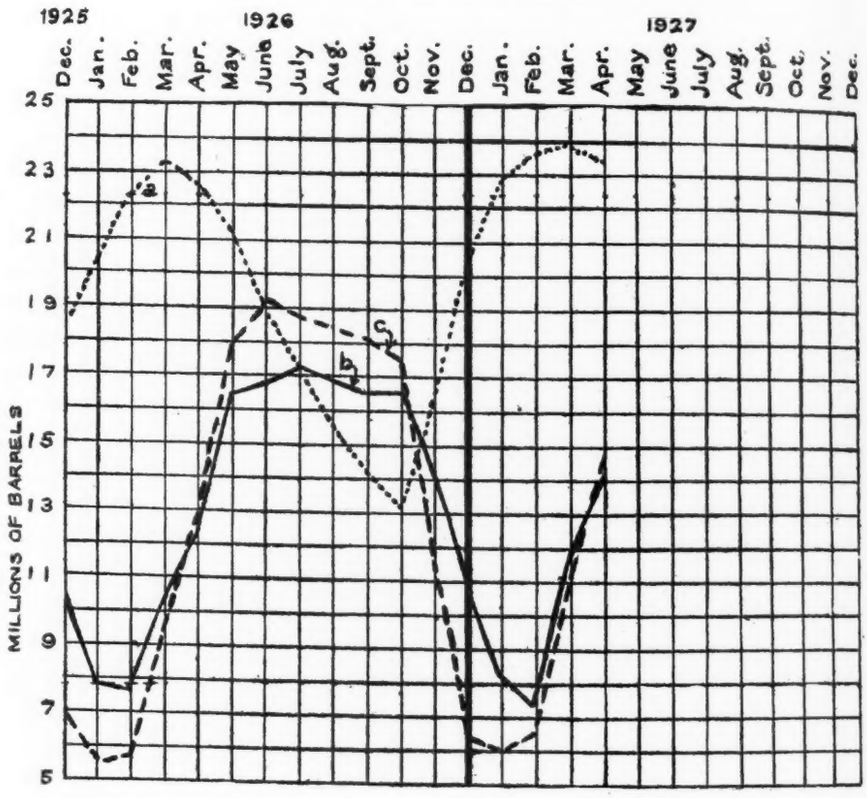
Stocks of clinker, or unground cement, at the mills at the end of April, 1927, amounted to about 13,338,000 bbl. compared with 12,997,000 bbl. (revised) at the beginning of the month.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1926 AND 1927

Month	1926	1927
January	9,074,000	9,989,000
February	10,931,000	11,943,000
March	12,290,000	*12,997,000
April	12,967,000	13,338,000
May	11,695,000	
June	10,144,000	
July	8,604,000	
August	7,362,000	
September	6,112,000	
October	5,370,000	
November	5,748,000	
December	7,799,000	

*Revised.

MONTHLY FLUCTUATION IN PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT



(a) Stocks of finished portland cement at factories. (b) Production of finished portland cement. (c) Shipments of finished portland cement from factories

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during the months of February and March, 1926, and 1927:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN FEBRUARY AND MARCH, 1926 AND 1927, IN BARRELS*

Shipped to—	1926—Feb.	1927	1926—March	1927
Alabama	145,636	127,020	158,310	141,921
Alaska	264	132	917	305
Arizona	28,956	41,677	54,916	45,602
Arkansas	55,984	59,309	66,712	59,114
California	714,783	649,302	1,156,509	1,094,778
Colorado	51,068	45,006	81,623	47,912
Connecticut	29,323	58,534	78,962	109,035
Delaware	6,437	13,885	22,386	24,826
District of Columbia	47,086	59,964	63,249	95,396
Florida	445,674	285,604	402,888	290,682
Georgia	86,417	134,787	139,781	169,167
Hawaii	15,830	31,022	24,737	19,615
Idaho	19,524	27,495	42,131	35,047
Illinois	429,654	417,054	†570,121	752,148
Indiana	121,253	143,650	†190,063	267,288
Iowa	50,077	55,837	116,367	147,119
Kansas	114,296	107,823	182,003	166,110
Kentucky	56,249	78,183	†88,790	111,854
Louisiana	84,706	122,629	96,214	134,893
Maine	19,084	5,422	18,302	20,132
Maryland	77,537	123,421	132,720	231,780
Massachusetts	57,390	81,457	168,271	193,283
Michigan	253,661	301,666	†396,643	525,901
Minnesota	72,714	61,047	164,405	147,967
Mississippi	47,179	62,783	58,308	75,149
Missouri	202,914	173,365	332,104	287,825
Montana	9,867	9,845	17,203	19,365
Nebraska	49,054	39,594	121,456	81,860
Nevada	5,754	3,649	8,824	7,665
New Hampshire	12,750	9,599	18,043	25,391
New Jersey	163,588	279,739	424,812	611,542
New Mexico	14,308	20,957	18,594	32,564
New York	434,323	855,484	†1,026,903	1,511,091
North Carolina	139,656	168,720	271,422	235,316
North Dakota	4,903	3,081	23,260	20,429
Ohio	250,265	321,218	†420,536	576,334
Oklahoma	167,043	191,130	206,766	235,301
Oregon	58,991	53,310	117,611	91,820
Pennsylvania	351,940	476,001	†745,395	864,996
Porto Rico	0	1,275	0	2,500
Rhode Island	10,166	19,874	34,838	50,746
South Carolina	56,022	47,821	69,811	71,247
South Dakota	18,848	10,170	38,194	31,724
Tennessee	86,871	102,871	117,610	137,431
Texas	364,107	371,525	367,833	491,261
Utah	15,613	15,527	37,117	25,741
Vermont	1,640	4,472	5,052	9,397
Virginia	77,572	92,723	121,765	124,387
Washington	77,936	124,266	152,534	229,012
West Virginia	45,121	64,296	†89,108	97,058
Wisconsin	80,066	100,245	†155,840	221,345
Wyoming	11,710	7,754	12,225	10,293
Unspecified	20,827	18,914	†37,724	16,486
	5,762,637	6,682,134	9,467,908	11,017,151
Foreign countries	57,363	48,866	71,092	65,849
Total shipped from cement plants	5,820,000	6,731,000	9,539,000	11,083,000

*Includes estimated distribution of shipments from three plants in February, 1927; from four plants in February, 1926; and from five plants in March, 1926 and 1927.

†Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1926 AND 1927

Month	1926—Production	1927	1926—Shipments	1927	Stocks at end of month 1926	1927
January	7,887,000	8,258,000	5,674,000	5,968,000	20,582,000	22,914,000
February	7,731,000	7,377,000	5,820,000	6,731,000	22,385,000	23,560,000
March	10,390,000	11,452,000	9,539,000	11,083,000	23,236,000	*23,922,000
First quarter	26,008,000	27,087,000	21,033,000	23,782,000		
April	12,440,000	14,048,000	12,965,000	14,350,000	22,710,000	23,620,000
May	16,510,000	.....	17,973,000	.....	21,255,000	.....
June	16,866,000	.....	19,134,000	.....	19,000,000	.....
Second quarter	45,816,000	.....	50,072,000	.....	.....	.....
July	17,134,000	.....	18,812,000	.....	17,301,000	.....
August	16,995,000	.....	18,583,000	.....	15,718,000	.....
September	16,571,000	.....	18,087,000	.....	14,188,000	.....
Third quarter	50,700,000	.....	55,482,000	.....	.....	.....
October	16,596,000	.....	17,486,000	.....	13,334,000	.....
November	14,193,000	.....	11,276,000	.....	16,243,000	.....
December	10,744,000	.....	6,432,000	.....	20,616,000	.....
Fourth quarter	41,533,000	.....	35,194,000	.....	.....	.....
	164,057,000	.....	161,781,000	.....	.....	.....

*Revised.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN APRIL, 1926 AND 1927, AND STOCKS IN MARCH, 1927

Commercial district	Production 1926—April—1927		Shipments 1926—April—1927		Stocks at end of 1926—April—1927		Stocks at end of Mar. 1927*
East'n Penn., N. J. & Md.	3,258,000	3,640,000	3,679,000	4,163,000	5,311,000	5,154,000	5,677,000
New York	517,000	898,000	660,000	843,000	1,485,000	1,624,000	1,568,000
Ohio, W. Penn. & W. Va.	1,248,000	1,409,000	1,195,000	1,301,000	2,792,000	3,380,000	3,272,000
Michigan	762,000	1,056,000	610,000	963,000	1,931,000	2,068,000	1,975,000
Wis., Ill., Ind. & Ky.	1,400,000	1,552,000	1,550,000	1,623,000	3,816,000	3,277,000	3,348,000
Va., Tenn., Ala. & Ga.	1,260,000	1,354,000	1,311,000	1,385,000	1,059,000	1,147,000	1,178,000
Eastern Mo., Iowa, Minn. & S. Dak.	1,134,000	982,000	1,142,000	977,000	3,078,000	3,231,000	3,226,000
W. Mo., Neb., Kan. & Okla.	854,000	964,000	899,000	791,000	1,443,000	1,757,000	1,584,000
Texas	411,000	469,000	447,000	491,000	501,000	425,000	448,000
Colo., Mont. & Utah	240,000	210,000	225,000	194,000	322,000	486,000	470,000
California	1,009,000	1,177,000	958,000	1,263,000	553,000	606,000	692,000
Oregon & Washington	347,000	337,000	289,000	356,000	419,000	465,000	484,000
	12,440,000	14,048,000	12,965,000	14,350,000	22,710,000	23,620,000	23,922,000

*Revised.

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN MARCH, 1927

Imported from—	District into which imported	Barrels	Value
Belgium	Florida	59,642	$80,451
	Galveston	3,008	4,360
	Maine & N. H.	12,000	21,470
	Massachusetts	26,213	32,264
	New Orleans	9,858	12,178
	New York	149	300
	Oregon	3,000	4,317
	Porto Rico	11,528	22,869
	San Francisco	6,000	7,644
	Washington	100	169
	Total	131,498	$186,022
Denmark and Faroe Islands	Porto Rico	22,122	$35,063
France	San Francisco	2,504	$3,058
Germany	New Orleans	5,000	$5,152
Japan and Chosen	Hawaii	5,000	$9,793
Norway	Massachusetts	5,000	$8,340
	South Carolina	6,000	7,570
	Total	11,000	$15,910
United K'gd'm	Massachusetts	1,496	$2,413
	New York	1,025	1,694
	Philadelphia	1,500	2,409
	Total	4,021	$6,516
	Grand total	181,145	$261,519

*Exports and Imports**

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN MARCH, 1927

Exported to—	Barrels	Value
Canada	604	$3,331
Central America	12,208	33,358
Cuba	5,191	13,280
Other West Indies	4,214	10,145
Mexico	5,028	16,201
South America	35,066	129,818
Other countries	5,645	34,032
	67,956	$240,165

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO IN MARCH, 1927*

	Barrels	Value
Alaska	964	$3,023
Hawaii	29,548	65,965
Porto Rico	8,500	20,604
	39,012	$89,592

*Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

Overproduction of Cement in the Far East

A TREMENDOUS advance in cement production took place during the war in countries which up to that time were dependent on Germany for their supply of cement. As a result of this, Germany now faces strong competition in the world market.

Japan, which before the war—1909 to 1913—produced from 400,000 to 600,000 tons (2,200,000 to 3,300,000 bbl.), exported but little cement. The number of plants grew from 19 in 1913 to 31 in 1918 and Japan began to export cement. The following figures illustrate this growth:

PRODUCTION (IN TONS) OF GERMAN AND JAPANESE CEMENT

	1913	1918	1925
Japan	632,000	1,130,000	2,580,000
Germany	7,350,000	1,919,000	5,807,000

At present Japan has 33 cement plants whose capacity greatly exceeds domestic needs. The high initial cost that a cement plant represents does not permit a plant of this kind to remain idle. Thus there was but one alternative: to launch the product in the world market at domestic prices. This export goes mainly to China, the Dutch Indies and the Philippines. Some of it goes even to South America, formerly the best German export market. Japan has every advantage in exporting cement, as all cement plants are located near the shipping points.

Australia has also created her own cement industry. In 1912, 8% of exported German cement went to Australia. In 1913 the 66,000 tons (363,000 bbl.) imported from Germany constituted a considerable share of the total import of 120,000 tons (660,000 bbl.). The first cement plant was built at Port Adelaide just before the war. In 1914 the approach to a new bridge near Stansbury was cut off by an avalanche, exposing a formation of excellent cement raw material. Other cement plants followed, until the present capacity of Australian plants is 830,000 tons (4,665,000 bbl.). The completion of plants under construction will raise this figure to 1,000,000 tons (5,500,000 bbl.). The domestic demand, however, was but 600,000 tons (3,300,000 bbl.) in 1925.

Though India still imports cement, the industry has grown tremendously. While in 1914 practically no cement was manufactured in India, the output for 1924 was 265,000 tons (1,457,000 bbl.) and the capacity of plants, 600,000 tons (3,300,000 bbl.).

A surplus is noted in almost every country. Even in the United States, where the demand for cement has grown from year to year in an unparalleled manner, the difference between potential productive capacity and shipments was but 24,750,000 bbl. in the years 1923 and 1924, which is not too large, considering the 137,500,000 bbl. shipped. This difference, however, rose to about 30,000,000 bbl. in 1925 and it is estimated that this became about 37,000,000 bbl. in 1926.

The increasing competition is forcing some countries to resort to drastic measures, such as the "dumping" of cement by Japan which has entirely cut off the market in the Far East. Though Australia and India are able to produce more cement than they need, they cannot yet reduce their prices to equal those of countries suffering from overproduction. —*Tonindustrie-Zeitung.*

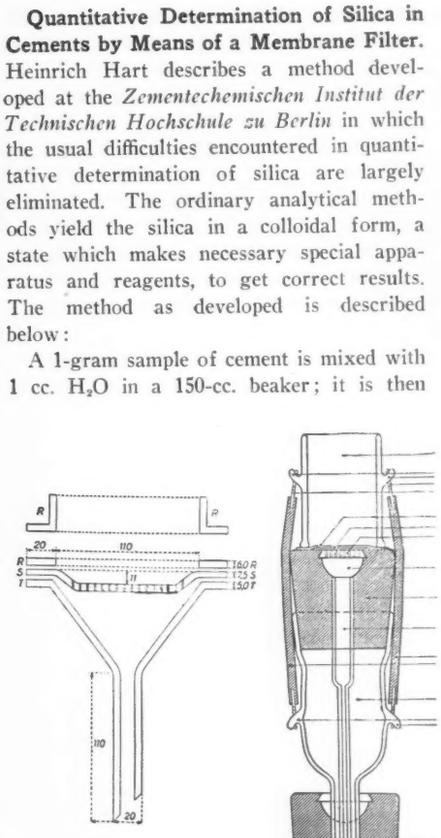
EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1926 AND 1927

Month	Exports 1926 Barrels	1926 Value	1927 Barrels	1927 Value	Imports 1926 Barrels	1926 Value	1927 Barrels	1927 Value
January	72,939	$216,431	75,346	$254,072	360,580	$576,717	193,175	$269,661
February	73,975	220,706	71,404	233,985	314,118	527,948	130,421	200,680
March	69,080	205,647	67,956	240,165	493,241	812,968	181,145	261,519
April	96,296	284,772	.....	.....	257,302	398,114	.....	.....
May	78,601	224,365	.....	.....	223,130	337,031	.....	.....
June	80,684	248,814	.....	.....	335,570	495,744	.....	.....
July	130,822	370,220	.....	.....	250,862	395,981	.....	.....
August	64,946	216,489	.....	.....	350,638	560,532	.....	.....
September	70,920	239,174	.....	.....	194,129	308,224	.....	.....
October	69,389	225,874	.....	.....	263,403	386,335	.....	.....
November	76,598	238,103	.....	.....	55,233	82,949	.....	.....
December	89,976	305,238	.....	.....	151,850	246,293	.....	.....
	974,226	$2,995,833	.....	.....	3,250,056	$5,128,836	.....	.....

Foreign Abstracts and Patent Review

Quantitative Determination of Silica in Cements by Means of a Membrane Filter. Heinrich Hart describes a method developed at the *Zementechemischen Institut der Technischen Hochschule zu Berlin* in which the usual difficulties encountered in quantitative determination of silica are largely eliminated. The ordinary analytical methods yield the silica in a colloidal form, a state which makes necessary special apparatus and reagents, to get correct results. The method as developed is described below:

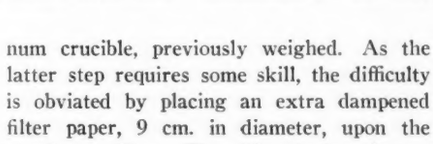
A 1-gram sample of cement is mixed with 1 cc. H_2O in a 150-cc. beaker; it is then



Sectional views of apparatus used in making quantitative determination of silica in cements by means of a membrane filter

decomposed with 3 to 5 cc. concentrated HCl (sp. gr. 1.19) being stirred to insure a complete reaction. The gel thus formed is placed in a warm sand bath or over the flame of a Bunsen burner, the heating being effective in transforming the last traces of the silica sol into gel. It has been found advisable to let the mass cool. It is then diluted with cold water up to about 100 cc., stirred vigorously to break up all gel lumps, filtered and washed well with hot diluted hydrochloric acid and with boiling water.

The apparatus, consisting of a flat perforated porcelain disc, funnel, ring, stand, rubber stoppers and suction flask and pump, is cleaned. One or two filter papers are placed on the perforated disc and form the base for the membrane filter. The filtration process is thus distributed over the entire area of the membrane filter. The rate of suction is regulated by passing a little water through the apparatus. Washing is done with hot diluted hydrochloric acid and 8 to 10 times with boiling water. The apparatus is taken apart after the filtration is completed and the silica removed to a platinum crucible, previously weighed. As the latter step requires some skill, the difficulty is obviated by placing an extra dampened filter paper, 9 cm. in diameter, upon the membrane filter. The silica is largely retained on the filter paper and can be easily lifted out and placed in the crucible. The quantity still remaining on the membrane filter can be scraped with a little piece of filter paper and also placed in the crucible. The crucible and contents are then dried to constant weight at 110 deg. C. The increase in weight after allowing for the filter papers and membrane is calculated as SiO_2.



Assembled apparatus for quantitative determination of silica in cements. Left—Special porcelain funnel arrangement and right—modified Buwa assembly

A large number of cements and other silicates were tested in this manner. The results showed that the accuracy of the silica determination was independent of the kind of membrane filter used; the selection of the filtering medium thus is controlled mainly by considerations of time, as rapid filtering may sometimes be desirable. The reliability of this method of determination is evident not only from the accuracy of the value of silica content, but also from the fact that the values of sesquioxide content are no longer obscured by small quantities of silica. This was demonstrated successfully on a high strength special cement with very high content of sesquioxides.

Additional tests were made of sodium-hydrosilicates to extend the procedure beyond the scope of cements. A perfect agreement was obtained with values given by the Association of German Portland Cement Manufacturers, operating in accordance with their methods.

Magnesium Oxide Cements. The desiccation curves of the solid masses obtained by mixing magnesium chloride solutions with magnesium oxide have a point of inflexion corresponding with the presence in the partially dried mass of 6 mols. of water per mol. of magnesium chloride in addition to the water required to convert the oxide into hydroxide. For the crystallized oxychlorides the corresponding figure was 4·4—6·7. On rehydration, those specimens take up most water which contained most originally. If the solid cement is immersed in a 5*N*- or 8*N*-magnesium chloride solution, magnesium chloride is taken up relatively rapidly at first, then more slowly, the rate of absorption in this latter stage being the more rapid the less the amount of chloride originally present in the cement. After some time fine crystals appear near the cement, indicating that the chloride-oxide mixture contains even after setting unchanged oxide, which first dissolves in the concentrated chloride solution and then separates out as oxychloride. The smaller the amount of water used to mix the cement, the greater is its hardness when set, as measured by the load necessary to break a cylinder of it supported horizontally at its two ends. The concentration of the magnesium chloride used to mix the cement must exceed a certain minimum value, which depends on the physical state of the oxide used, for setting to occur at all. With increase in the concentration beyond this value, the hardness of the cement increases at first rapidly and subsequently more slowly.

For a given composition of the initial mixture, the hardness of the cement varies considerably with the fineness and mode of preparation of the oxide; in general the fine-grained oxide prepared from the oxalate yields the hardest masses. With increasing temperature, the minimum chloride concentration which will produce hardening increases. The hardening powers of the magnesium salts decrease in the order: chloride, bromide, sulphate, nitrate. On desiccation at the ordinary temperature the hardness increases slowly at first then, when most of the water has been lost, much more rapidly. Rehydration causes the hardness to fall below its initial value. On dehydration at higher temperatures, the hardness commences to decrease again after a certain point, which, however, corresponds with no particular stoichiometric mass composition.

The microscopical examination indicates that setting is not due to the formation of crystalline oxychlorides, but to the chloride solution causing the grains of oxide to swell, owing to some chemical change in their interior, until they come into such close contact that they cohere. The effect of various salt solutions on the hardened cement has been examined. Ferric, aluminum, stannic and cupric chlorides dissolve it to form colloidal solutions. Zinc and nickel chlorides harden it, whereas calcium and barium chlorides soften it. *Helv. Chim. Acta* (1927), **10**, 140-167, and *Brit. Chem. Abs.* (1927), **46**, 300.

Rotary Kiln. A rotary kiln for burning lime or cement is provided with two enlarged zones, each about double the regular

diameter of the kiln, situated between three regular kiln sections. The regular section at the lower end of the kiln constitutes the clinkering zone and is followed by an enlarged section (calcining zone). The enlarged section at the raised end of the kiln is the pre-heating zone. *A. Lacore* and *J. Piron, British Patent No.* 259,238.

Constituent Proportions of Magnesia Cements—Their Soundness and Tensile Strength. Keppeler and Muller have carried out extensive tests on magnesia cements recently. By combining the different constituents of magnesia (Sorel) cement, (magnesium oxide, magnesium chloride and water) in different proportions, it was demonstrated that these proportions had an important effect on the properties of magnesia cement, aside from the method and temperature of calcination of magnesite. The investigations also included cements with admixtures of sand and wood fiber. Soundness and tensile strength tests were made. The variation of the properties was studied by means of three-component diagrams. It was found that the ratio of MgO to $MgCl_2$ was of especial influence. With a MgO and magnesium chloride solution of 20 deg. Baumé, the most favorable proportions are in the ratio $MgO{\cdot}MgCl_2$ of 11.6 and 13.5. No filler admixtures were used in this series. Further investigation disclosed that the favorable relations remained the same in the presence of admixtures. In formula 2, calcined magnesite, sand and 20% $MgCl_2$ solution, the optimum ratio of $MgO{\cdot}MgCl_2$ is 11.2, which corresponds to a tensile strength of 60 kg. per sq. cm. (852 lb./in.^{2}). Substitution of wood fiber for sand the optimum ratio is 11.7 and tensile strength, 82 kg. per sq. cm. (1164 lb./in.^{2}).

In using a concentrated solution of magnesium chloride (30% $MgCl_2$), the favorable proportions become displaced in the direction of magnesium chloride. Caustic magnesite and $MgCl_2$ (30% solution), with admixtures of wood fiber, yields a molecular ratio of $7MgO{\cdot}1MgCl_2$ and a tensile strength of 95 kg. per sq. cm. (1350 lb./in.^{2}). The corresponding mixture without wood fiber shows a ratio of 6.2 and a tensile strength of 75 kg. per sq. cm. (1065 lb./in.^{2}).

It therefore follows that the tensile strength and soundness of magnesia cements, particularly with admixtures of wood fiber, are very favorably affected by the use of concentrated (30% $MgCl_2$) magnesium chloride solutions, these mixtures bearing the ratio of 1 mol. $MgCl_2$ to about 7 mol. MgO. If, however, a magnesium chloride solution of only 20 deg. Baumé is used, as is commonly practiced in the manufacture of Sorel cements, the favorable molecular ratio becomes $12MgO{\cdot}1MgCl_2$. — *Tonindustrie-Zeitung* (1927), **25,** 395-398.

Aluminous Cements. Raw cement materials are ground fine and heated to temperatures below clinkering point (about 1000 to 1100 deg. C.). The raw materials comprise limestones, clay, iron ore and siliceous rocks. *British Patent No.* 250,246.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Dry Chamber Process for Production of Lime or Cement. A mixture of portland cement-forming materials in dry finely powdered form, blown as a jet in a combustion chamber into a region wherein a vitrifying or calcining temperature is maintained by a flaming jet of combustible separate from the

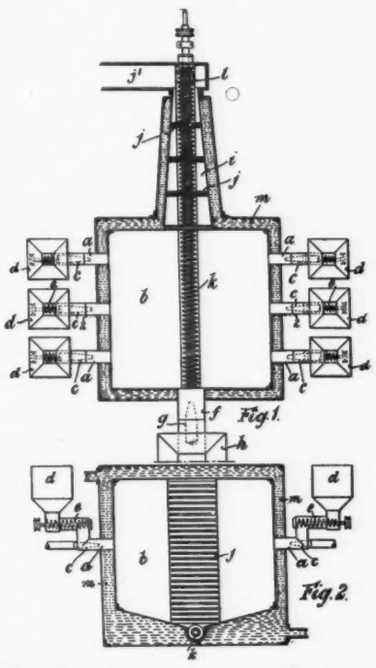


Fig. 1.

Fig. 2.

Chamber process for manufacture of lime or portland cement

jet of portland cement-forming mixture, is caused to encounter the flaming jet.

The flaming jet which the powdered cement-forming material to be vitrified, blown by a jet of compressed air from a nozzle into the chamber encounters, may be a flaming blast of combustible gas, oil or even powdered solid combustible conveyed by a jet of compressed air from another nozzle.

The vitrifying temperature is as usual about 1500-1600 deg. C.

The above described method is also applicable to lime burning, chalk or limestone vastly in excess of the ash-content, if any, of the fuel, being blown into the high temperature region instead of cement-forming material.

A plant for carrying out the invention is diagrammatically illustrated on the accompanying drawing, in which: *a* are burner nozzles through which flaming blasts of powdered solid fuel, for instance, coal dust, are blown into a chamber *b* by jets of compressed air issuing from nozzles *c*. The powdered fuel is fed to each burner *a* from a hopper *d* by a screw conveyor *e*.

The burners *a* are arranged at opposite sides of the chamber *b*, the burners on the one side being opposite those on the other side so that their blast flames mutually encounter.

Similarly at one end of the chamber *b*, a jet of powdered cement-forming material is blown into the chamber *b* from a nozzle *f* by an air jet from a nozzle *g*, the powdered material being fed from a hopper *h*.

The jet of cement-forming material projected from the nozzle *f* transversely encounters and penetrates into the flaming blasts of fuel from the burner nozzle *a*, and, the temperature of the flames being appropriately adjusted, is vitrified therein.

When the plant is used for burning lime, obviously limestone or chalk is substituted for powdered cement-forming material in the hopper *h*, and the blast flames from the nozzle *a* are adjusted to give a flame of a suitable temperature for reducing the limestone or chalk to lime.

Part of the cloud of cement or lime, as the case may be, settles in the combustion chamber *b*, but some tends to be carried by the products of combustion out of the chamber. To give the powdered material opportunity to settle and to promote such settlement, a lateral flue *i* is branched off from the chamber *b* opposite the nozzle *f*. This flue *i* is divided by baffles *j* at intervals into a series of chambers in which the powdered material is encouraged to settle by the checks imposed by the baffles to the flow of the combustion gases and also by reason of the extended path thereby provided for such gases.

The settling flue *i* conveniently progressively converges transversely in order to maintain the rate of flow of the flue gases despite the progressive deposit of material and the reduction of volume due to cooling. The settling chamber may, however, be otherwise arranged to provide by the reduction of volume of the gases or positively by an enlargement of the section of the flue encouragement to settling of the material by a reduction in the velocity of flow of the gases.

The material which settles on the floor of the subdivided flue *i* and on the floor of the combustion chamber *b* adjacent to the inlet of this flue is removed by a screw conveyor *k*, and delivered at an outlet *l* in the floor at the end of the flue *i*.

The spindle of the screw conveyor *k* is hollow and traversed by cooling water.

From the flue *i* the combustion gases pass to an uptake by a lateral flue j^1.

The walls, floor and roof of the chamber *b* and of the flue *i* are hollow and are traversed by water, to cool the deposited material. The water jacket *m* thus constituted acts as a boiler for the recovery and utilization of heat. The baffles *j* may likewise be hollow and traversed by water for the cooling purposes. The heat thus abstracted from the material may be utilized for heating and to supply hot air to the nozzles, for pre-drying material to be treated and for supplying steam or hot water.

When solid combustibles are employed they are so selected that the ash-content is such as not materially to alter the adjustment of the mixture. *G. E. Heyl, U. S. No.* 1,625,853.

Traffic and Transportation

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Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts), as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Apr. 23	Limestone Flux Week ended Apr. 30	Sand, Stone and Gravel Week ended Apr. 23	Sand, Stone and Gravel Week ended Apr. 30
Eastern	3,312	3,440	9,034	10,226
Allegheny	3,690	3,656	8,156	8,379
Pocahontas	571	655	906	1,109
Southern	598	548	11,962	12,492
Northwestern	1,405	1,785	5,620	7,575
Central Western	556	632	7,675	9,868
Southwestern	390	324	4,501	4,737
Total	10,522	11,040	47,854	54,386

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1926 AND 1927

	Limestone Flux 1926 Period to Date May 1	Limestone Flux 1927 Period to Date Apr. 30	Sand, Gravel and Stone 1926 Period to Date May 1	Sand, Gravel and Stone 1927 Period to Date Apr. 30
Eastern	46,560	55,553	54,540	64,582
Allegheny	59,725	58,638	58,250	73,752
Pocahontas	5,509	4,957	9,375	9,019
Southern	11,439	8,853	167,542	181,353
Northwestern	16,590	19,005	44,583	59,943
Central Western	7,819	7,794	111,312	109,555
Southwestern	3,477	5,112	67,826	74,549
Total	151,119	159,912	513,428	572,753

Comparative Total Loadings, 1926 and 1927

	1926	1927
Limestone flux	*151,119*	*159,912*
Sand, stone and gravel	*513,428*	*572,753*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning May 22:

CENTRAL FREIGHT ASSOCIATION DOCKET

15655. To establish on **crushed stone**, carloads, Arlington, Ohio, to Toledo, Ohio, and intermediate N. Y. C. R. R. stations, rate of 60c per net ton. No switching charges to be absorbed at Toledo, Ohio. Present rate, 70c per net ton.

15657. To establish on **crushed stone**, carloads, East Liberty, Ohio, to Glendale and Cincinnati, Ohio, rate of 100c per net ton. Route—Via N. Y. C. R. R., Wapakoneta, Ohio, and B. & O. R. R. Present rate, 16½c.

15663. To establish on **gravel and sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, Cleves, Ohio, to Glenwood, Ind., rate of 104c per net ton. Present rate, 6th class.

15664. To establish on **crushed stone**, carloads, White Sulphur, Ohio, to Marysville, Ohio. Rate of 50c per net ton. Present rate, 60c per net ton.

15666. To establish on **crushed stone**, carloads, East Liberty, Ohio, to Delaware, Ohio, rate of 75c per net ton. Route via N. Y. C. R. R., Marysville, Ohio, and C. C. C. & St. L. Ry. Present rate, 12c (6th class).

15670. To establish on **gravel and sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, Burr Oak, Ind., to stations on Penn. R. R. in Indiana, following rates: Plymouth, Donaldson, Groverton, Hamlet, Wanatah, Hanna, Inwood, Bourbon, Etna Green, Atwood, Warsaw, present 6th class, proposed 80c; Valparaiso, present 6th class, proposed 85c.

15677. To establish on **sand**, blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, and **gravel**, carloads, Henlein, Jackson Centre, Leesburg and Schollard, Penn., to Sheffield, Penn., rate of 151c and to Wilcox, Penn., rate of 176c per net ton.

15678. To establish on **stone, crushed**, in bulk, in open top cars, stone, screenings, in bulk in open top cars, carloads, Ridgeville, Ind., to various points in Indiana, following rates:

Marion	75	80	Homer	90	101
Centerville	70	95	Manilla	95	101
Cambridge City	75	95	Hagerstown	75	88
Dublin Jct.	80	95	New Castle	80	88
Bentonville	80	101	Honey Creek	85	*260
Falmouth	85	101	Anderson	95	*260
Rushville	90	101			

*Sixth class.

15679. To establish on **sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, molding or silica and **gravel**, carloads, Winona Lake, Ind., to Bourbon, Ind., rate of 60c per net ton. Present rate, 69c per net ton.

15680. To establish on **stone, crushed**, in bulk, in open top cars, carloads, Woodville, Ohio, to Akron, Ohio, B. & O. Ry. delivery, rate of 90c per net ton. Present rates, 340c per net ton.

15684. To establish on **sand and gravel**, carloads, East Liverpool, Ohio, to Newton Falls, Ohio, rate of 100c per net ton. Present rate, 13½c.

15685. To establish on **sand and gravel**, carloads, Bedford, Ohio, rate of 70c per net ton. Present rate, 80c per net ton.

15698. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), and **gravel**, Jamestown, Penn., to Cleveland, Ohio, rate of 65c per net ton. Present rate, 100c per net ton.

SOUTHERN FREIGHT ASSOCIATION DOCKET

33803. **Sand and gravel**, from Carrollton, Ky., to Hazard, Harlan and Allais, Ky. It is proposed to establish the following reduced rates on sand and gravel, straight or mixed carloads, minimum weight 90% of marked capacity of car, except that when cars are loaded to their visible capacity, actual weight will govern—from Carrollton, Ky.: To Hazard and Allais, Ky., 180c; to Harlan, Ky., 190c per net ton, such rates to be observed as maxium at intermediate points. The suggested rates are based 10c per ton over rates from Louisville, Ky.

33817. **Sand** from Dixiana, S. C., to Alexander, Pineville and Winston-Salem, N. C. Lowest combination rates now apply. Proposed rates on sand, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern—from Dixiana, S. C.: To Pineville, 135c; Alexander, 162c, and Winston-Salem, 162c per net ton. Proposed rates are made on basis of proposed Georgia scale for joint line application by trunk lines, less 10%.

33821. Molding **sand** from Ohio River crossings to Hickory, N. C. It is proposed to cancel the rate of 428c per net ton, applicable on molding sand, carloads, minimum weight 60,000 lb., from Cincinnati, Ohio, Newport, Covington, Lexington, Frankfort, Louisville, Ky., Jeffersonville and New Albany, Ind., to Hickory, N. C., allowing the rate of 473c, minimum weight 40,000 lb., to apply. The rate of 428c, subject to 60,000 lb. minimum, should have been canceled when the rate of 473c was published.

33900. **Gravel** from Owensboro, Ky., to Livermore and Island, Ky. Present rate, 90c per net ton. Proposed rate on gravel, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight shall govern, from Owensboro, Ky., to Island and Livermore, Ky., 80c per net ton, same as rate applicable to these points from Millport, Ky.

33906. **Gravel and sand** from Black Creek, Miss. (plant of the Concrete Gravel Co.), to stations on the C. & G. Ry. and M. & O. R. R.; cancellation. It is proposed to cancel the present commodity rates on gravel and sand, carloads, from and to points mentioned, as published in So. Ry. I. C. C. A9416, account of no movement. Combination rates to apply after cancellation.

33995. **Agricultural lime** or land plaster from Norfolk, Va., and group to Virginia points (within 150 miles of Norfolk, Va.). It is proposed to establish rates on agricultural lime or land plaster, carloads, minimum weight 50,000 lb., from Norfolk, Va., and group to points within the state of Virginia on basis of scale ranging from 80c for 10 miles up to 130c for 50 miles, 155c for 70 miles, 180c for 100 miles and 220c per net ton for 150 miles. The proposed scale to apply only on intrastate traffic. The suggested scale reflects 80% of the Interstate Commerce Commission's Docket 16295 scale, with rates ending in either naught or five, fractions having been disposed of under the general plan of dropping amounts less than 2½c, amounts of 2½c and less than 2¾c converted to 5c, and increasing amounts 2¾c and over to next naught.

34007. **Gravel** (for fluxing purposes) from Napier, Tenn., to Rockdale, Tenn. Present rate, 140c per net ton. Proposed intrastate rate on gravel (for fluxing purposes), carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight shall govern—from Napier, Tenn., to Rockdale, Tenn., 57c per net ton, made with relation to current rate from Iron City and West Point, Tenn., to Rockdale, Tenn.

34029. **Limestone**, ground, etc., from Ocala, Fla., to Birmingham, Ala., and group. In lieu of Montgomery, Ala., combination, it is proposed to establish rate of 261c per net ton on: Limestone, ground, powdered or pulverized, carloads, minimum weight 60,000 lb., from Ocala, Fla., to Birmingham, Ala., and group, made on basis of the proposed Georgia scale, extended for a distance of 503 miles for joint haul, less 10%.

34055. **Sand and gravel** from Jackson's Lake, Prattville Junction, Coosada and Oktamulke, Ala., to Samson, Ala. It is proposed to establish the following reduced rates on sand and gravel, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their ful visible capacity actual weight will govern, to Samson, Ala.: From Jackson's Lake, 122c; from the other origins named, 126c per net ton; made in line, distance considered, with present rates to Opp and Geneva, Ala.

34071. **Limestone** from Allens Creek, Tenn., to Lyle, Tenn. The rate of 60c per ton of 2240 lb., at present published on limestone, carloads, from Allens Creek, Tenn., to Lyle, Tenn., expires May 31, 1927. It is proposed to extend the expiration period of the rate for a period of 90 days after May 31, 1927.

SOUTHWESTERN FREIGHT BUREAU DOCKET

12124. **Crushed stone**, from points in Texas to points in Oklahoma. To establish the following rates in cents per 100 lb. on crushed stone, carloads, minimum weight 50,000 lb., or marked capacity of car if that be less than 50,000 lb., to Oklahoma points shown below:

To	—From— Lone Star Spur, Tex.	—From— Morris Spur, Tex.	To	—From— Lone Star Spur, Tex.	—From— Morris Spur, Tex.
Wellington	9	9	Coles Spur	9	9
Dodsonville	9	9	Humphreys	9	9
Hollis	9	9	Tipton	9	9
Gould	9	9	Burt	9	9
McQueen	9	9	Frederick	9	9
Duke	9	9	Hollister	8½	9
Victory	9	9	Loveland	8½	9
Welon	9	9	Grandfield	9½	9
Altus	*9	9	Devol	8½	9

Rate of 9c per 100 lb. has been approved from Lone Star Spur and Morris Spur, Tex., to Dodsonville and Wellington, Tex., and the object of

the above is merely to line up intermediate Oklahoma points to clear the fourth section.

12138. **Crushed stone,** between points in Kansas and points in Oklahoma. To establish the following distance scale of rates on crushed stone, carloads, minimum weight marked capacity of car, except when loaded to full visible capacity of car actual weight, but not less than 50,000 lb., will apply between points in Kansas and points in Oklahoma.

Dist. Miles	Rates Single Lines	Two Lines	Three Lines	Dist. Miles	Rates Single Lines	Two Lines	Three Lines
5	3½	4½	5	180	8	8½	8½
15	3½	4½	5	190	8	8½	8½
20	3½	4½	5	200	8	8½	8½
25	3½	4½	5	210	8	9	9½
30	3½	4½	5½	220	8	9	9½
40	3½	4½	5½	225	8½	10	10
50	4	5	5½	230	8½	10	10
60	4	5	6	240	8½	10	10
70	5	5½	6	250	8½	10	10
75	5	5½	6½	260	9	10½	11½
80	5	5½	6½	275	10	10½	11½
90	5½	6½	6½	280	10	11½	12½
100	5½	6½	6½	300	10	11½	12½
110	5½	7	7	320	10½	12	13
120	6½	7	7	340	10½	12	13
125	6½	7	7	350	11½	12	13
130	6½	7	7½	360	11½	13	14
140	7	7	7½	400	11½	13	14
150	7	7	7½	410	12½	14	15
160	7	8	8	430	12½	14	15
170	7	8	8	450	12½	14	15
175	8	8½	8½	500	13½	15	16

Shippers of crushed stone in Kansas must meet competition of the Oklahoma shippers to points in Oklahoma, but under the present adjustment this is impossible account lower rates are applicable on Oklahoma intrastate traffic than on interstate traffic. Shippers have requested the Oklahoma basis of rates, but it is proposed to establish the 9702 scale with the Oklahoma and Kansas intrastate scales as minimum.

12233. **Sand,** from points in Kansas to Tonkawa, Okla. To establish a rate of 4c per 100 lb. from Mulvane, Kan., to Tonkawa, Okla., and rate of 4c per 100 lb. from Arkansas City, Kan., to Tonkawa, Okla., and 3½c per 100 lb. to Ponca City, Okla., on sand, carloads, minimum weight marked capacity of cars, except on shipments in open cars loaded to full visible space capacity, actual weight will govern. The above rates are desired in order that the Oklahoma points mentioned will have same rates as Whaley, Bramen and Sumpter, Okla.

TRUNK LINE ASSOCIATION DOCKET

15185. **Sand,** carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Carpenterville, N. J., to Pequest and Great Meadows, N. J., $1.15 per 2000 lb., subject to Rule 77. Reason—To establish rate which will be comparable with those in force from Succasumma and Morristown, N. J., as per D. L. & W. R. R. Tariff I. C. C. No. 20267.

15218. **Sand,** blast, engine, foundry, glass, loam, molding or silica, and sand, ground from silica or pebble rock, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Dunbar, Penn., to Glenshaw, Penn., $1.45 per 2000 lb. Reason—Proposed rate is based on the West Virginia scale for actual distance.

15270. **Sand,** other than blast, engine, foundry, molding, glass, quartz, silica or silex, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Franks-town, Penn., rates to following points in Pennsylvania:

To	Prop.	To	Prop.
Huntingdon	125	Port Royal	175
Mapleton	125	Millerstown	185
Mt. Union	140	Newport	185
Vineyard	140	Duncannon	205
Mifflin	175	Marysville	205

The above rates in cents per 2000 lb.

Reason—To establish rates which will be comparable with those in force to same points of destination from Oreminea, Penn., as per P. R. R. Tariff G. O. I. C. C. 14119.

15276. **Crushed stone,** carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Auburn, N. Y., to Milfred and Bernice, Penn., $1.50 per 2000 lb. (subject to Rule 77). Reason—To establish commodity rates which will be comparable with rates now in effect under similar conditions, mileages and services.

15288. **Sand** (other than blast, engine, foundry, glass, molding, quartz, silex or silica), pebbles, whole or crushed (not flint or grinding) and pebble grits, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Williamstown Jct., N. J., to Reading Co. points, West Collingswood, Egg Harbor, Atco, Cape May, Grenloch, N. J., and other points in South Jersey territory, rates on sand ranging from 69c to 92c per 2000 lb., rates on pebbles ranging from 70c to $1.05 per 2000 lb. Reason—Proposed rates compare favorably with rates published locally by the P. R. R. from Menantico and Manumuskin, N. J., to points in the same destination territory, as per P. R. R. G. O. I. C. C. No. 14467.

15292. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Morrisville and Tullytown, Penn., to Garrett Road, Penn., 95c per 2000 lb. Reason—Proposed rates compare favorably with rates in force on like commodities from Morrisville and Tullytown to points in the same destination territory, as per P. R. R. Tariff G. O. I. C. C. No. 14342.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

12288. **Sand,** common building; gravel, screening, carloads, minimum weight 90% marked capacity of car, from Greenbush, Mass., to West Quincy, Mass., 50c per ton of 2000 lb. Reason—Same as rate to contiguous points.

12320. **Limestone** (fluxing stone), carloads, minimum weight 90% of marked capacity of car, from Richmond, Mass., to Troy, N. Y., 88c per ton of 2240 lb., via Rensselaer, N. Y., and N. Y. C. R. R. Reason—To establish rate comparable with existing rate to point of destination from competitive points.

12323. **Sand, core,** carloads, minimum weight 90% marked capacity of car, from Onset, Mass., to Union Market, Mass., $2.15 per ton of 2000 lb. Reason—To place rate on same basis as other rates.

12326. Common building **sand** and run of bank or screened or crushed **gravel,** carloads, minimum weight marked capacity of car, from Scotia, N. Y., to Saratoga Springs, N. Y. (Cedar Bluff delivery), 55c per ton of 2000 lb.

WESTERN TRUNK LINE DOCKET

1740C. **Sand,** carloads, minimum weight 90% of marked capacity of car, except that when loaded to full visible capacity actual weight will apply, but not less than 40,000 lb., from Keokuk and Ft. Madison, Iowa, to stations on the Q. O. & K. C. R. R. in Missouri, Taylor to Sorrell, inclusive. Present (per 100 lb.) and proposed (per net ton) rates to a few representative points are as follows:

Keokuk To	Pres.	Prop.	Ft. Madison To	Pres.	Prop.
Taylor	11c	$0.90	Taylor	11c	$1.00
Lewistown	11c	1.00	Lewistown	11c	1.20
Brashear	11c	1.30	Brashear	11c	1.40
Novinger	11c	1.40	Novinger	11c	1.40
Sorrell	11c	1.40	Sorrell	11c	1.40

1376K. **Sand,** silica, pumice and volcanic ash, carloads, minimum weight marked capacity of car, but not less than 60,000 lb., except where car of less than 60,000-lb. capacity is furnished at carrier's convenience, when marked capacity of car will govern, from Anthony and Speed City, Kan., to St. Joseph, Mo., Atchison and Leavenworth, Kan. Present rate, Class E, viz., 21c from Anthony and 19c from Speed City, Kan.; proposed, 14½c per 100 lb.

1055A. **Crushed stone,** carloads, minimum weight 90% of marked capacity of car, except that when weight of shipment when loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply, but in no case shall the minimum carload weight be less than 40,000 lb., from Spencer, S. Dak. (Rates in cents per 100 lb.)

To	Pres.	Prop.
Sioux City, Iowa	6½	5½
Council Bluffs, Iowa	9½	8½
Omaha, Neb.	9½	8½

2898D. **Sand, gravel,** sand and gravel pit strippings, carloads, minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., from Janesville, Wis., to La Moille, Minn. Present rate, 8½c per 100 lb.; proposed, 7c per 100 lb.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4033. **Sand,** carloads, from Ottawa, Ill., to Sciota, Ill. Present rate, 140c; proposed, 125c per net ton.

Recent I. C. C. Hearings

19080. Hearing in docket 19080, North Shore Material Co. and others against the C. M. & St. P. and others was held in Chicago before Examiner Smith, May 11. The case involves rates on sand from Riton, Wis., to destinations on the Chicago, North Shore and Milwaukee, an electric line between Chicago and Milwaukee. The complainant alleges that the refusal of the C. M. & St. P. to publish joint through rates with the electric line during the period involved in the complaint was unduly prejudicial of it and unduly preferential of its competitors at points in Illinois. It further alleges unreasonableness of the rates on numerous shipments since September 10, 1925, and misrouting of those shipments. The C. M. & St. P. has, since the time of the shipments, established joint rates with the North Shore.

C. B. Ackerman, representing the complainant, introduced testimony as to the history of the rates involved and other rate information. The rates on the shipments, as stated by him, ranged from $1.15 a ton, plus $2.70 a car for the E. J. & E. interchange to Lake Forest, Ill., to $1.25 a ton, plus the interchange charge, to Ravinia, Ill. He said it had been the policy of the Milwaukee not to publish joint rates with the North Shore, but that, about April 20, that had been changed and there was now a rate of 80 cents from Riton to the destination points involved and that the interchange charge was absorbed by the carriers. The complainant asked reparation to the basis of the present rates, he said. At the time the shipments moved, he said, there was an 80-cent rate available from Riton to the destinations involved, via other routes. He made numerous rate comparisons to substantiate the contention of the complainant that the rates charged were unreasonable.

O. H. Timm, commerce agent for the C. M. & St. P., introduced an exhibit setting out various scales applicable and sand and gravel prescribed by the Interstate Commerce Commission in various parts of the country. These, he said, demonstrated that the rates charged were not unreasonable. He pointed out that there was no tariff route specifying interchange between the Milwaukee and the North Shore at Libertyville and contended that the commission had previously passed on the reasonableness of that route in a former complaint brought by the present complainant. It was his contention that the rates since published by the Milwaukee were excessively depressed.

18988. Lime rate from Milltown, Ind., to California, Ohio (163 miles) found unduly prejudicial, in that it exceeds by more than 1 cent the rate from Milltown, Ind., to the same destination (136.1 miles). Examiner thought rate from Milltown of 1 cent higher than from Mitchell was necessary to remove prejudice.

18785. Rate of 80 cents per 2000 ton of sand and gravel from Cleves, Ohio, to Walton, Ky., not unreasonable. Cleves is 16 miles west of Cincinnati and within the latter's switching district. Walton is 21 miles south of Cincinnati. Rate of 63 cents from Cincinnati to Walton, Ky., not applicable in this case.

16693. Sand and gravel rates from Muscatine, Iowa, to central Illinois destinations found unreasonable in that they exceed by more than 10 cents a ton the crushed stone rates from Buffalo and Linwood, Iowa, to the same destinations. Rates to be revised within 90 days.

Huron Gravel Company to Build Plant at Dexter

ANNOUNCEMENT is made in the *Ann Arbor* (Mich.) *Times-News* that the Huron Gravel Co., recently organized, is planning the erection of a modern, electrically operated sand and gravel plant near Dexter, Mich., on the Huron river. The company is reported to have acquired a 300-acre deposit upon which the plant for the production of from 50 to 100 cars per day of washed and screened material will be placed. About 25 men will be employed.

The principal stockholders of the Huron company are Howard and Paul Hoel of Detroit, formerly connected with the Greenville Gravel Corp., Greenville, Ohio. J. S. Elliott is manager.

Expect Floods to Have Little Effect on Cement Prices

PEOPLE in the building business are wondering what effect on cost the Mississippi floods eventually will have, says Allen E. Beals in the current *Dow Service Daily Building Reports.*

Contemplation by easterners of the afflicted area lying under flood waters stirs imaginings of a long and protracted reconstruction era in which vast quantities of concrete roads, foundation masonry and rebuilding in general will take place, thus diverting from Atlantic seaboard construction great quantities of basic building material that would normally flow here. The fear seems to have grown that the flood is a forerunner of a price rise in building materials.

The fact that two more cement companies had made overtures to others to purchase cement to meet orders of their own stimulated in the minds of prospective cement buyers the belief that there was to be a great diversion of cement traffic toward the south, where demand was expected to be exceedingly great following the subsidence of the flood waters.

H. C. Koch, vice-president of the International Cement Corp., operating eight mills at various points throughout the country, and which is completing a new plant at New Orleans, told why it was not at all probable that the flood would affect the cement demand, supply or price situations in the least.

"It is hard for an easterner to imagine the area under water," he said. "Native lumber, not cement, will have the biggest demand in the reconstruction program. Few houses down there have basements. Most of them, even when they cost as high as $15,000, rest on wooden piles. The walls are built up of boards, over which cloth is laid and on that wallpaper is spread.

"The roads, outside of Arkansas, are mostly clay and sand. Where concrete highways occur they may have been washed out, but the slabs will be raised and put back on a sand and gravel base.

"Cement would have an important part to play if Congress decides to build a barrier, like the 'Galveston wall,' through the danger parts of the Mississippi lowlands. Such a project would dwarf the cement requirements of the Panama Canal, but it is too remote to have the slightest bearing on the reconstruction problem incidental to the present flood. There isn't anything now in sight,' he said, "in connection with the flood that can have any possible influence upon the market price of cement."

A. S. T. M. to Hold 1927 Meeting at French Lick, Ind.

THE 30th annual meeting of the American Society for Testing Materials will be held at French Lick Springs hotel, French Lick, Ind., June 20 to 24 inclusive. An exceptional program of interest has been arranged with several features which should attract rock products manufacturers. In all 13 sessions will be held.

The 11th and 12th sessions will be held simultaneously and the subjects covered will be lime, cement, gypsum, road materials and waterproofing. Committee C-11 on gypsum will report on tentative revisions of specifications for gypsum plaster, tile, etc., and submit new definitions of gypsum plaster. The report of Committee C-1 on cement contains some interesting papers such as "Long Time Tests on High-Magnesia Portland Cements," "Tensile Strength of Portland Cement Constituents" and others. The report on lime, Committee C-7, gives among other things revisions of the methods for chemical analysis of limestone, quicklime and hydrated lime.

The report of Committee C-9 on concrete and concrete aggregates will be presented at the 13th session on June 24, at which date other committee reports on concrete and a symposium on the field control of the quality of concrete will be held.

All members attending the meeting will receive as they request a complete set of reprints of reports and papers. Requests should be forwarded to the secretary-treasurer of the association, C. L. Warwick, 1315 Spruce street, Philadelphia, Penn.

French Government Tests Iron Plate Highways

HEAVY iron plate highways, laid and joined to a concrete base, are said to be under construction by the French government for test purposes. They are said to be as near wear proof as any material could be, but they have the disadvantage of growing uncomfortably hot under a bright sun.

They are favored by the general staff of the army. Gen. Gassouin points out they would form a much needed reserve of iron in case of a long war. Roads of secondary importance would be stripped of their iron and the concrete base would still serve as a road.—*Chicago (Ill.) Bulletin.*

New York Union Enjoined from Discriminating Against Building Material Producers Outside the Metropolitan Area

JUDGE THACHER of the district court, southern district of New York, has recently granted an injunction to the Decorative Stone Co., New Haven, Conn., against the Building Trades Council of Westchester county, New York, which in effect is an order to the council to cease discriminating against the cast stone produced by the New Haven company.

The action of the trade unions in this case was found to involve a conspiracy and combination monopolistic in character on the part of employes to exclude from the market competition which might affect the economic interests of their employers and the action was enjoined by the court.

The opinion of Judge Thacher follows in abstract:

This is not a case in which the restraint of or interference with interstate trade and commerce can be said to be the identical and indirect result of a controversy purely local in character and not intended to restrain interstate trade. On the contrary, the primary purpose and the direct result of what was done in New York was to exclude the plaintiff's product and the product of other manufacturers moving in interstate commerce from entering the New York market in competition with New York firms. And there was no local controversy in New Haven of which this was the indirect result. It is a matter of no consequence that the purpose was also to shut out stone manufactured within the state of New York as well as that made outside the state. (United States v. Brims, cited by the Supreme Court of the United States, November 23, 1926; No. 212, October term, 1926.) Whatever was done in New Haven was incidental to the primary purpose of exclusion from the channels of trade. The defendants conspired and contrived to prevent the use of plaintiff's product in building operations within the city of New York, and in furtherance of this purpose, to refuse to handle it or to work on any building in which its use was employed, and to procure all other workmen employed in the building trades to do likewise; and in accomplishment of this purpose, to order the men in the plaintiff's plant to refuse to work on any stone intended for the New York market. I am satisfied that the demand for increased wages was inspired merely as part and as incidental to this general conspiracy and combination, monopolistic in character and clearly in restraint of trade. The result is that the plaintiff is entitled to injunctive relief. A decree in its favor may be settled accordingly, and upon the settlement of the decree counsel will be heard on the question as to whether there should be a reference to determine damages claimed to be recoverable by the plaintiff.

Cement Products

Cement Block With Colored Facing

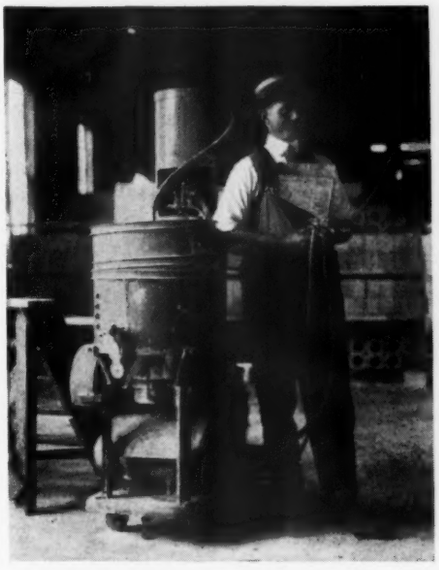
Economy Duntile Co., Birmingham, Alabama, Makes a Specialty "Duntile" in Popular Shades

"DUNTILE" is the name of a building unit which is made on a machine that differs widely from the usual form of block machine. Instead of striking tampers this machine uses a revolving packer to consolidate the concrete mixture in the mold. The air space in the Duntile block is a circular section made by this packer as it forces the mix outwardly against the sides of the mold. A firm and dense block is produced, so firm that it can be transferred from the machine to the car that takes it to the curing room without any pallet.

One of the newest Duntile plants is that of the Economy Duntile Co., of Birmingham, Ala. This form of building unit is fairly popular in the southeastern states, and while the business is young the manager of the plant says that he has sold his output from the first without any trouble.

Slag and Sand Aggregates

Birmingham crushed slag (No. 7) and Montgomery sand are the aggregates used. Both are received in railroad cars at the plant and the cars are unloaded by shovelling into wheelbarrows which are pushed on an elevated runway and emptied into bins. This is a temporary arrangement and it will be replaced by a horizontal conveyor arranged to deliver to any bin, although the unloading will still be by shovelling.



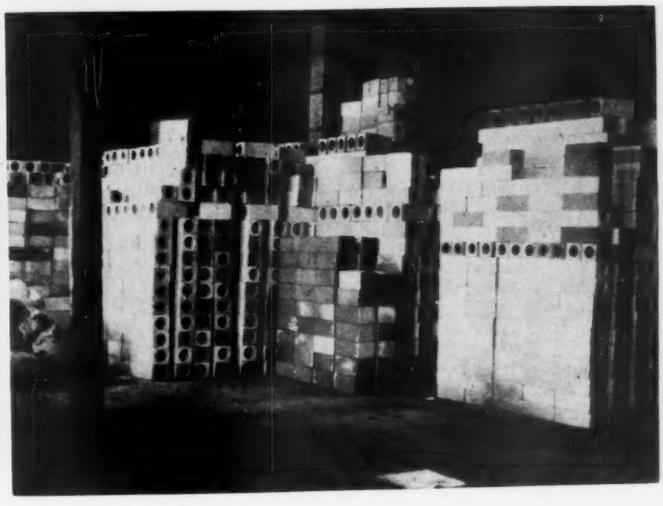
W. T. Robinson demonstrating the compressed air machine for facing tile

Aggregates are wheeled from the bin to piles at the lower end of an incline up which the self-dumping skip containing the charge for the mixer is hoisted. Aggregates are measured in a box which is struck off so as to get the same amount each time. The usual mix is 1-1½-2. Water is added from a measuring tank to insure a constant moisture content and consistency.

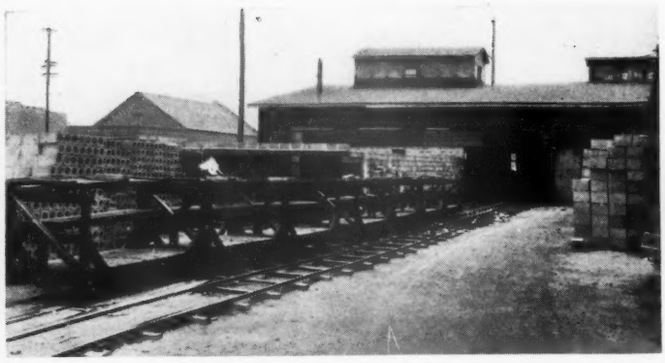
Mixing Operation

The mixer used with this machine is a flat tank with a vertical shaft in the center carrying arms which have plow shaped pieces attached. These thoroughly turn and mix the materials. The mix given here is at least two minutes, and generally it is longer. The mix is dumped into the hopper of the machine when the machine operator signals. The mixer is on a platform above the machine but all its operations are controlled by a man on the ground. He measures the materials into the skip, adds the water from the measuring tank, starts and stops the mixer and discharges it into the machine hopper without even seeing it.

Charging skip and box for measuring aggregate



Samples of tile with colored facing in the stock room



Wooden cars handling green tile—these were built at the plant

Office and works of the Economy Duntile Co., Birmingham, Ala.

This plant makes the full Duntile line, but it specializes somewhat on colored facings. These tile are faced with different mixtures which are applied through a hose by compressed air. Applied in this way, the facing mixture becomes practically a part of the block itself and cannot be peeled off.

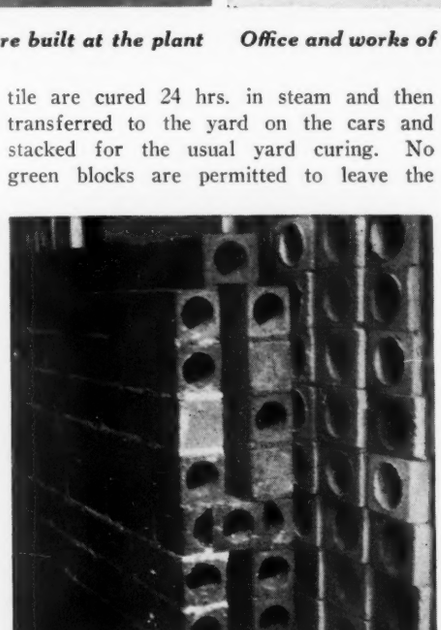
Colored Facings

Several colors are used, one of the most popular being a cream-colored shade known as old ivory. Reds of various depths of color are made and W. T. Robinson, the plant manager has recently introduced a very pretty facing of a purplish-gray tint. This is made of a mixture of dark and light aggregates of his own selection.

Where these faced block are used they are generally built into the wall in what the Dunn company (which originated it) calls the "thermos bottle" type of construction. The tile are laid in such a way as to have an air space between the inner and outer walls and to have no continuous mortar joint through the wall. In concrete block construction, trouble has sometimes come from moisture passing not through the block itself but through the mortar joints and wetting the back of the interior plaster so as to loosen it. With the "thermos bottle" method of laying up the wall, this cannot happen as there are no mortar joints passing through from the outside to the inside. A tile with a half tile on either side forms the tie by which the inner and outer walls are held together.

The cars which are used at this plant for conveying the green tile to the curing rooms are of wood and built at the plant. They have to be somewhat larger than for the usual type of tamped block as space has to be left between the tile for removing the mold. As the tile are handled without pallets, the mold has to be set on the car and opened, allowing the block to rest on the car, and then set block on the machine. But the operation takes little, if any, more time than transferring on a pallet would take.

The curing rooms or kilns are 50 ft. long and 4 ft. 6 in. wide, just wide enough to accommodate a car easily. Steam is generated for curing by steam pipes which lie in a long trough filled with water. The tile are cured 24 hrs. in steam and then transferred to the yard on the cars and stacked for the usual yard curing. No green blocks are permitted to leave the yard on account of the danger of shrinkage in the wall from their use.



Tile laid up in the "thermos bottle" wall construction

The company's office and works is at 2716 North 24th street, Birmingham. W. L. Sibley is president of the company.

Washington Products Company Building New Plant

CONSTRUCTION work on a new 60x90-ft., two-story factory building for the Cement Products Co., Renton, Wash., has been started, according to the *Renton* (Wash.) *Chronicle*. Upon completion, modern machinery for the manufacture of cement products will be installed. The new plant is located on a two-acre site connected by spur to the railroad.

Six sets of bunkers for each size of sand and gravel used, to be filled at street level, will be built at the plant. Included in the equipment to be installed is a pipe-manufacturing machine with double tamping arrangement for reinforced pipe up to 42-in. diameter and a 60-ft. crane to handle large sizes of pipe and other products.

Two steam curing rooms are included in the plans. The boiler will be equipped with an automatic stoker. When the new equipment is in place it is planned to manufacture cement shingles, roofing tile, concrete metal fronts and plain and fancy bricks. The present line consists of concrete pipe from 3½ in. up to 36 in., septic tanks, posts for state and county highways, Stonetile for concrete houses, cement footing blocks in all sizes, concrete chimney blocks, several designs of flower pots, downspout traps, drainage tile and a number of other articles.

The plant supplies a large part of the surrounding territory with products and practically all the pipe for the drainage construction on the highways thereabouts. At present it is working two shifts to catch up with orders, employing about 15 men. L. D. Shew is the general manager.

Cement Monuments Growing in Popularity

MEMORIAL stones, monuments and other markers which until the past few years were chiefly constructed of granite or other cut stone are now being made of cement in quantities, says a report in the *Brattleboro* (Vt.) *Reformer*. The granite industry, under the auspices of the American Granite Association, has just begun an intensive drive to stimulate the use of granite in memorials and calls attention to the competition from the cement products industry.

As recently as two or three years ago, the possibility that cement would ever seriously compete with granite would have been laughed at, the report states. During 1926, however, the officers of the granite association "have observed such activity on the part of cement people in promoting their material in our field and we have observed so many actual contracts that we are compelled to realize that we are now face to face with the unexpected," in the words of L. O. Holman, the association's secretary.

The cement industry has begun to emphasize in its advertising campaigns the suitability of cement for memorials. The Portland Cement Association, it is said, has conducted a series of experiments in its laboratories in the use of cement for monumental purposes.

To Enforce Cement Securities Decree

THE federal government is seeking a buyer for two of the cement mills owned by the Ideal Cement Co., according to the *Denver* (Colo.) *Post*. These two plants, one at Concrete, near Portland, Colo., and the other, which may be either of the mills at Trident and Hanover, Mont., were ordered sold by a federal court decree in December, 1924.

Commenting on the situation the *Post* says:

"H. B. Teegarden, special assistant attorney general from Washington, D. C., is in Denver, Friday, May 13, conferring with company officials in an attempt to reach agreement as to what is a reasonable price. This is believed to indicate the government then will try to line up a buyer. The fact that no serious attempt has been made by any individual or organization to buy the two plants since the court decree was entered is taken in financial circles to indicate the demand for competition is not so strong as the government thought.

"The action against the Ideal company—then the Cement Securities Co.—was started in the federal court in 1921. The government charged the company had owned or controlled a majority of the portland cement plants in the Rocky Mountain territory since its organization in 1908, and contended conditions would be better if it were compelled to dispose of some of them.

"A decree was finally entered, ordering sale of the plant at Concrete and one of the two plants at Hanover and Trident, Mont. The company has a total of eight plants in five states, but only the two mentioned in the decree are affected.

"As the sale has not been made because the company thus far has not found a purchaser, Mr. Teegarden has been sent here from Washington to confer with District Attorney George Stephan and company officials and see what can be done to facilitate compliance with the decree."

A later edition of the same paper states:

"As a result of failure to agree as to the valuation of two plants owned by the Ideal company, United States District Attorney George Stephan and Special Assistant Attorney General H. B. Teegarden of Washington decided Friday night to ask for an order appointing an appraiser, and authorizing sale of the factories at public auction to the highest bidder.

"A wide variance in estimates of the value of the plants existed between the government officials and representatives of the corporation. The former held the value of one of the plants at $1,200,000 and the latter at $3,000,000. Friday afternon was spent in a conference to decide on a common basis of valuation. It was unsuccessful.

"The application for an appraiser and the sale at auction will probably be made early next week. It is hoped that the appraisal will be made and the plant sold within 90 days."

Jean H. Knox Enters Consulting Engineering Practice

JEAN H. KNOX, former engineer and manager of the Dallas Washed and Screened Gravel Co., Dallas, Tex., has announced his entrance into private practice as a consulting engineer, specializing in the design and operation of sand, gravel and crushed stone plants, with address at 702 N. Bishop Ave., Dallas.

Mr. Knox has just completed a preliminary study of the products of the Chico Stone Products Co. and is now engaged in a series of tests for the J. Fred Smith Gravel Co., Dallas, and the Ft. Worth Sand and Gravel Co., Ft. Worth.

Jean H. Knox

For the past several years Mr. Knox has devoted much of his time to the study and practice of concrete engineering, with particular reference to the part played by aggregates in the design and control of concrete mixtures.

Since graduation in civil engineering from the University of Illinois, in 1907, Mr. Knox has had a wide experience in engineering with a number of prominent firms in Illinois, Oklahoma, Texas and on the Pacific coast, engaging in the construction of buildings, roads and bridges.

His service during the World War added to his engineering accomplishments through his work with the U. S. Naval Reserve (aviation) at a number of naval bases and air stations.

Subsequently Mr. Knox became engineer and assistant manager of the Continental Asphalt and Petroleum Co., during which time his experience in asphalt road construction was considerably broadened.

He is an associate member of the American Society of Civil Engineers, a member of the American Concrete Institute, and an associate member of the National Sand and Gravel Association.

New York State Crushed Stone Producers Discuss Operating Problems

AT a meeting of the New York State Crushed Stone Association, Syracuse, N. Y., April 20, 19 members were present. President George E. Schaefer, of the General Crushed Stone Co., Rochester, N. Y., presided.

There was considerable discussion in reference to the new sizes of concrete pavement aggregate specified by the New York State Highway Department. None of the producers had shipped any of the new sizes as yet, so discussion was put over until the next monthly meeting.

President Schaefer called upon Mr. Amos Shepard, vice-president of the Federal Mutual Insurance Co., of Boston, to address the members present on workmen's liability insurance. A very interesting and instructive talk was given by Mr. Shepard on this type of insurance in general, and considerable stress was given on safety work and methods of adapting such work to the quarry industry. He stated that insurance is vital because it is costly and that from 10 to 15% of accidents were caused by machinery and from 80 to 85% of all accidents were due to carelessness upon the part of the employe.

Educational work should be carried on, he said, in all plants and furthered by appointment of a safety committee to bring cooperation of the workers and to instil safety education in each and every employe.

A vote of thanks was rendered Mr. Shepard by the members present.

Letters were presented by Mr. Sporborg and read by President Schaefer in regard to the ten amendments passed by the legislature in respect to state compensation law; the principle one being the change of payment for lost time of $25 per week instead of the present $20. It was commented upon that such change may tend to further advance compensation rates in New York state.

Motor Trucks in Quarries

John Rice was called upon regarding motor truck transportation in quarries and stated that at his Winchester, Mass., quarry the cost of operating a 7½-ton Mack truck carrying a load of 10 to 11 tons, with a total average of 500 tons per day, was $18.75 per day or 3.7c per ton. His costs at the White Haven plant, carrying 300 tons per day, was $17.45 or 5.8c per ton. In a general sort of way costs average 4c or 5c per ton. General discussion by all members developed further interesting points on quarry operating costs.

The secretary offered a resolution of thanks be extended members of the Solvay Process Co. and the Rock Cut Stone Co., both of Syracuse, for their very cordial and genial hospitality.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	.....	1.60	1.30	1.30	1.30
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Danbury, Conn.	2.25	2.25	2.00	1.75	1.50	.....
Dundas, Ont.	3.04	1.05	1.05	.90	.90	.90
Frederick, Md.	.50@ .75	1.20@1.30	1.15@1.25	1.10@1.15	1.10@1.15	1.05@1.10
Munns, N. Y.	1.00	1.50	1.50	1.40	1.25	1.25
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	.....
Prospect, N. Y.	1.00	1.50	1.40	1.30	1.30	.....
Walford, Penn.	.70	.....	1.35h	.....	.....	.....
Watertown, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.85	.....	1.85	.....	.....	.....
Buffalo, Iowa	1.10	.....	1.50	1.30	1.35	1.35
Chasco, Ill.	1.00@1.30	.....	1.00@1.15	.....	1.00@1.15	.....
Columbia, Krause, Valmeyer, Ill.	1.10@1.50	1.10@1.25	1.20@1.35	1.10@1.35	1.10@1.35	‖1.25
Flux (Valmeyer)	1.10@1.50	.....	.....	1.75	.....	1.75
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Linwood, Iowa	.95e	.....	1.50[1]	1.40[2]	1.30[3]	.....
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
River Rouge, Mich.	1.20	1.20	1.20	1.20	1.20	1.20
Milltown, Ind.	.....	.90@1.00	1.00@1.10	.90@1.00	.85@ .90	.85@ .90
Mt. Vernon, Ill.	1.10@1.20	1.00	1.00	1.00	1.00	.....
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	.....	1.25	1.10	1.00	.....
St. Vincent de Paul, Que. (A)	.80	1.25	1.00	.95	.95	.95
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Ont.	1.55	2.05	2.05	1.90	1.90	1.90
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
Wisconsin Points	.50	.....	1.00	.90	.90	.....
Youngstown, Ohio	.70j	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h
SOUTHERN:						
Alderson, W. Va.	.40	1.45	1.35	1.25	1.20	.....
Atlas, Ky.	.50	1.00	1.00	1.00	1.00	1.00
Brooksville, Fla.	.75	.....	2.65	2.65	2.40	2.00
Cartersville, Ga.	1.15	1.65	1.65	1.40	1.15	.....
Chico, Tex.	1.00	1.35	1.25	1.20	1.10	1.00
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	.....
Ft. Springs, W. Va.	.50	1.35	1.35	1.20	1.20	.....
Graystone, Ala.	.50	Crusher run, screened, $1 per ton				
Kendrick and Santos, Fla.		3½ in. and less, $1 per ton				
Ladds, Ga.	.....	1.65	1.65	1.35	1.15	1.15
New Braunfels, Tex.	.60	1.25	1.10	.90	.90	.90
Rocky Point, Va.	.50@ .75	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kans.¶	.50	1.90	1.90	1.90	1.90	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Kansas City, Mo.	1.00	1.60	1.60	1.60	1.60	1.60
Cape Girardeau, Mo.	.90	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis Co., Mo.	1.45	1.45	1.45	1.35	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Duluth, Minn.	.90	2.25	1.75	1.55	1.35	1.25
Dwight, Calif.	1.00	1.00	1.00	.90	.90	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.55	1.45	1.25	.....
New Haven, New Britain, Meriden and Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.40	1.80	1.40	1.40	1.40	.....
Oakland and El Cerito, Calif.	1.00	1.00	1.00	.90	.90	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
San Diego, Calif.	.70	2.00	1.50	.....	1.25	1.25
Springfield, N. J.	1.70	2.20	2.15	1.70	1.70	.....
Toronto, Ont.	.....	3.58@4.05	3.05@3.80	.....	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	.....
Columbia, S. C.—Granite	.....	2.00	1.75	1.75	1.60	.....
Eastern Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.		Crushed flint rock, 2.50 per cu. yd.				
Graystone, Ala.—Granite	.50	.....	.....	.....	.....	.....
Lithonia, Ga.	.75a	2.00b	1.75	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@3.00
Richmond, Calif.—Quartzite	.75	.....	1.00	1.00	1.00	.....
Rochester, N. Y.		Dolomite, all sizes, $1.50 per ton				
Somerset, Penn. (sand-rock)		1.50 to 1.85				
Toccoa, Ga.	.....	1.35	1.35	1.30	1.25	1.25

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.30. ¶Rip rap 1.60 per ton. (f) ¼ in. (h) Less 10c discount. (j) Less 10% net ton. (l) Less .05. (e) Agstone to June 15, 1927. [1] ¾ to ¼ in. [2] 1 to ¼ in. [3] 1½ to ¼ in. (A) Ballast .80.

Agricultural Limestone

(Pulverized)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 50 mesh	1.50
Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh	6.00
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh	1.50
Blackwater, Mo.—100% thru 4 mesh	1.00
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Brandon and Middlebury, Vt. — Pulverized, burlap bags, 6.00; paper, $5.00; bulk	4.00
Cape Girardeau, Mo.—50% thru 50-mesh	1.50
Cartersville, Ga.—50% thru 50-mesh	1.50
Charleston, W. Va.—Marl, per ton, bulk	3.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Tex.—50% thru 50 mesh, 1.75; 50% thru 100 mesh	2.25
Colton, Calif.—Analysis, 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Ft. Springs, W. Va.—50% thru 4 mesh	1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags	3.95
Bulk	2.70
(Paving dust)—80% thru 200 mesh, bags	4.25@ 4.75
Bulk	3.00@ 3.50
Jamesville, N. Y. — Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.25; bulk	2.75
Joliet, Ill. — Analysis, $CaCO_3$, 55%; $MgCO_3$, 45%; 90% thru 100 mesh	3.50
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
80% thru 200 mesh, bags, 4.25; bulk	3.00
Ladds, Ga.—Analysis, $CaCO_3$, 64%; $MgCO_3$, 32%; pulverized; 50% thru 50 mesh	1.50@ 2.75
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marlbrook, Va.—Marl, per ton, bulk	2.25
Marion, Va. — Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Middlebury, Vt. — $CaCO_3$, 99.05%; 50% thru 200 mesh; sacked	5.50
Milltown, Ind. — Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis, $CaCO_3$, 95%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk	2.00
Syracuse, N. Y. — Analysis 89% $CaCO_3$; $MgCO_3$, 4%; bags, 4.25; bulk	2.75
Toledo, Ohio—30% thru 50 mesh	2.25
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50
West Stockbridge, Mass. — Analysis, 90% $CaCO_3$, 50% thru 100 mesh; cloth bags, 4.50; paper, 4.00; bulk	3.25

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis, 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—90% thru 4 mesh	1.00
Bedford, Ind. — Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh; 25% thru 100 mesh; 50% thru 50 mesh	1.50

(Continued on next page)

Agricultural Limestone

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.75
50% thru 4 mesh	1.50
Chicago, Ill. — 50% thru 100 mesh; 90% thru 4 mesh	.80
Columbia, Krause, Valmeyer, Ill. — Analysis, 90% $CaCO_3$; 100% thru 4 mesh	1.10@ 1.50
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh	1.35
Danbury, Conn.—Analysis, 79% $CaCO_3$, 11% $MgCO_3$; 60% thru 100 mesh; 80% thru 50 mesh; 100% thru 4 mesh; bags, 4.25; bulk	3.25
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Kansas City, Mo. — 50% thru 100 mesh	1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92¼ $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@ 2.35
McCook, Ill.—90% thru 4 mesh	.90
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 100% thru 4 mesh; 20% thru 100 mesh	1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Mountville, Va. — Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh, bags	5.50
Pixley, Mo. — Analysis, 96% $CaCO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich. — Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes	1.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.30

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Joliet, Ill. — Analysis, 55% $CaCO_3$; 45% $MgCO_3$; 95% thru 100 mesh	3.50
Piqua, Ohio, sacks, 4.50@5.00; bulk	3.00@ 3.50
Rocky Point, Va.—82% thru 200 mesh, 2.50@3.50 bulk, paper bags	3.75@ 4.75
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.	2.00@ 2.25
Buffalo, N. Y.	2.00@ 2.50
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Elco, Ill.	*18.00@*31.00
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.25
Gray Summit and Klondike, Mo.	1.75@ 2.00
Los Angeles, Calif.—Washed	5.00
Mapleton Depot, Penn.	2.00@ 2.25
Mendota, Va.	2.25@ 2.50
Michigan City, Ind.	.35
Mineral Ridge and Ohlton, Ohio	2.50
Oceanside, Calif.	3.00
Ohlton, Ohio	2.50
Pittsburgh, Penn.	3.00@ 4.00
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.00
San Francisco, Calif.	4.00@ 5.00
Silica, Va.	2.50
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Warwick, Ohio (green)	1.75
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.75
Columbus, Ohio		.15@ .30
Dresden, Ohio		1.00@ 1.25
Eau Claire, Wis.	4.25	1.00
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

*Ground silica, carload.

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.65	.65	.65	.65	.65	.65
Boston, Mass.‡	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.10	.95	.95			
Erie, Penn.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.58	.48	.85	1.25	1.15	
Leeds Junction, Me.		.50	1.75		1.25	1.00c
Machias Jct., N. Y.	.75	.75	.85	.75	.75	.75
Montoursville, Penn.	1.00	.85	1.00	.90	.90	.90
Portland, Me.		1.00	2.25		2.00	
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Penn.		2.00				
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.60@ .85	.60@ .85	1.70	1.50	1.50	1.30
York, Penn.	1.10	1.00				
CENTRAL:						
Aurora, Ill.		.40@ .50	.40	.50	.70	.70
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Appleton and Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Attica, Ind.			All sizes .75@.85			
Barton, Wis.		.50	.75	.75	.75	.75
Chicago district, Ill.	.70	.55	.55	.60	.60	.60
Columbus, Ohio¶		.75	.75	.75	.75	
Des Moines, Iowa	.40	.40	1.40	1.40	1.40	1.40
Eau Claire and Chippewa Falls, Wis.	.40	.40	.65@ .75	.90	.90	
Elkhart Lake, Wis.	.50	.40	.30	.55	.50	.50
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Grand Haven, Mich.		.60@ .80	.70@ .90	.70@ .90		.70@ .90
Grand Rapids, Mich.		.50		.80	.80	.70
Hamilton, Ohio		1.50*	1.50*	1.50*	1.50*	
Hersey, Mich.		.50				.70
Humboldt, Iowa	.50	.50	1.50	1.50	1.50	1.50
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Joliet, Plainfield and Hammond, Ill.	.60	.50	.50	.60	.60	.60
Mason City, Iowa	.50@ .60	.50@ .60	1.30	1.30	1.20	1.20
Mankato, Minn.				1.25	1.25	1.25
Mattoon, Ill.	.75@ .85	.60@ .85	.85	.85	.85	.85
Milwaukee, Wis.	.96	.91	1.06	1.06	1.06	1.06
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.40@ .50	.40@ .50	1.40	1.35	1.25	
Pittsburgh, Penn.	1.25	1.25	.85	.85	.85	.85
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.20	1.45	1.55a	1.45	1.45	1.45
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.25	1.15	1.15	1.15
Zanesville, Ohio		.60	.50	.60	.80	
SOUTHERN:						
Charleston, W. Va.	1.40	1.40	1.40	1.40	1.40	1.40
Brewster, Fla.	.45	.45	2.25			
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Chattahoochie River, Fla.		.70		1.75		
Eustis, Fla.		.50@ .60				
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Knoxville, Tenn.	1.00	1.00		1.20	1.20	1.00
Macon, Ga.	.50	.50			.95	
New Martinsville, W. Va.	1.00	.90@1.00		1.20@1.30		.80@ .90
Roseland, La.	.35	.35	1.25	1.00	.65	.65
WESTERN:						
Kansas City, Mo.		.70				
Los Angeles, Calif. (d)	.50	.50	1.10	1.10		1.10c
Oregon City, Ore.		1.50*	1.50*	1.50*	1.50*	1.50*
Phoenix, Ariz.	1.25	1.10	2.50	2.00	1.25	1.10
Pueblo, Colo.	.80	.60		1.20		1.15
San Diego, Calif.		.75	1.40	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.25	1.25	1.25	1.25	1.25	1.25

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Brookhaven, Miss.						.60
Burnside, Conn.	.75					
Chicago district, Ill.	.35					
Ferrysburg, Mich.						.65@1.00
East Hartford, Conn.	.75*					
Gainesville, Texas		1.00			.55	
Grand Rapids, Mich.				.50		
Hamilton, Ohio					1.00	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Lindsay, Texas		1.10				.55
Macon, Ga.	.35					
Mankato, Minn.	.30					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronts and Yorkville, Ill.			Ave. .60 per ton all sizes			
Somerset, Penn.		1.85@2.00		1.50@1.75		
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.40	.40				
York, Penn.	1.10	1.00				

*Cubic yd. ‡Delivered on job by truck. (a) ⅝-in. down. (b) River run. (c) 2½-in. and less. (d) Less 10c per ton if paid E.O.M. 10 days. (g) ¾-in. and less. ¶By truck only.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.25	2.00	2.25	1.50		4.00g	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75@2.00	1.75@2.00		1.75	2.00		
Buffalo, N. Y.	1.50	1.50		2.00@2.50			
Columbus, Ohio	1.50@2.00	1.25@1.50	2.00	.30	1.75@2.00	2.75@4.50	
Dresden, Ohio	1.50@1.75	1.25@1.50	1.50@1.75	1.00@1.25			
Eau Claire & Chippewa Falls, Wis.						3.00	
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	1.75	1.75		1.75			
Kasota, Minn.							1.00
Klondike, Mo.	1.75@2.00		1.75@2.00	1.75@2.00	1.75@2.00		1.75
Mapleton Depot, Pa.	2.00	1.90	2.00	2.00		2.00	
Massillon, Ohio	2.50	2.50		2.50	2.50		
Mendota, Va.	Ground flint or silex—16.00@20.00 per ton						
Michigan City, Ind.				.30	.30		
Millville, N. J.				1.75b		3.50	
Montoursville, Pa.				1.35@1.50			
New Lexington, O.	2.00	1.25					
Ohlton, Ohio	2.00*	2.00*		1.65*	1.50*	2.50*	1.75*
Ridgway, Penn.	1.50	1.50	1.75@2.00c				
Round Top, Md.				1.60		2.25	
San Fr'ncisco, Calif.[1]	3.50†	5.00†	3.50†	3.50@5.00†	3.50@5.00†	3.50@5.00†	
Silica, Va.	Potters' flint per ton, 9.00@10.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.55	.60		.75	.75		
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	1.75*@2.25	1.75*@2.25	2.00	1.75*@2.25	1.75*		
Zanesville, Ohio	2.00	1.50	2.00	2.50	2.50		

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (b) Damp. (c) Shipped from Albany. (g) Dry.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium, Erie and Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.30*	1.80*	1.45*		1.45*	
Jackson, Ohio		1.05*		1.30*	1.05*	1.30*	
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.50*		1.50*	1.50*	1.50*	
Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.	2.05*	.80*	1.35*	1.25*	.90*	.90*	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.15[5]
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95[4]
Chazy, N. Y.		8.50	7.50	10.00		15.50[23]	8.50	14.00
Lime Ridge, Penn.							5.00[2]	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00[12]
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	10.50	8.50	10.50	8.50	1.65[7]
CENTRAL:								
Afton, Mich.							8.50	1.35
Carey, Ohio	12.50	8.50	8.50		9.00		8.00	
Cold Springs, Ohio		8.50	8.50				8.00	
Cold Springs and Gibsonburg, Ohio	12.50	8.50	8.50		9.00	11.00		
Huntington, Ind.	12.50	8.50	8.50		9.00		8.00	
Luckey, Ohio	12.50							
Milltown, Ind.		8.50@10.00		10.00[8]			8.50[22]	1.35[10]
Scioto, Ohio	12.50[29]	8.50	8.50	10.00	.62½	7.50	1.50[3]	1.70[4]
Sheboygan, Wis.	11.50				9.50		9.50	.95
Wisconsin points[6]		11.50					9.50	
Woodville, Ohio	12.50	8.50	8.50	13.50	9.00		9.00	1.50[3]
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Texas							7.00	
Graystone & Landmark, Ala.	12.50	9.00	9.00	9.00@10.00			8@10	1.35
Keystone, Ala.	12.50	9.00	9.00	9.00@10.00			8.00	1.35
Knoxville, Tenn.	20.25	9.00	9.00	9.00	8.00		8.00	1.35
New Braunfels, Tex.	18.00	12.00	10.00	12.00	10.00		9.50	
Ocala, Fla.		11.00	9.00				11.00	1.50
Saginaw, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
WESTERN:								
Kirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Los Angeles, Calif.	19.00	19.00	14.00		16.20		12.50	2.50
Dittlinger, Tex.		12.00@13.00					9.50[8]	1.50[23]
San Francisco, Calif.	21.00	19.00	16.50				14.00	2.00
Tehachapi, Calif.					11.80			
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

[2] Net ton. [3] Wooden, steel 1.70. [4] Steel. [5] Per 180-lb. barrel. [6] Dealers' prices, net 30 days less 25c disc. per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65. [8] To 11.00. [10] To 1.50. [12] To 3.00. [22] To 9.00. [23] To 1.60. [28] Barrels. [29] F. o. b. Woodville.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing Sand	Traction
Mapleton Depot, Penn.	1.50	2.00@ 2.25
Massillon, Ohio		2.25
Michigan City, Ind. (Engine sand)		.20@ .30
Mineral Ridge, Ohio	*1.75	*1.75
Montoursville, Penn.		1.00@ 1.10
Ohlton, Ohio	a1.75	a1.60
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50	3.50
Thayers, Penn.		2.25
Warwick, Ohio		2.25
Zanesville, Ohio		2.50

*Wet. †Fine; coarse dry, 3.00@3.50. (a) Green.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons	.08
Per gross	1.00@ 1.50
Chatsworth, Ga.:	
Crude talc, grinding	5.00
Ground talc (150-200 mesh), bags	10.00
Pencils and steel worker's crayons, per gross	1.00@ 2.50
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	8.00@ 9.00
Including bags	9.00@10.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc (for grinding)	5.00
Ground talc (150-200), bags	10.00
Pencils and steel worker's crayons, per gross	1.00@ 1.50
Emeryville, N. Y.:	
(Double air floated) including bags;	
325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bulk	8.50@14.00
Joliet, Ill.:	
Roofing talc, bags	12.00
Ground talc (200 mesh), bags	32.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (125-200 mesh), bags	10.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Columbia, Tenn.—B.P.L. 65-70%	3.50@ 4.50
Gordonsburg, Tenn.—B.P.L. 65-72%	3.75@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 75%	5.50@ 6.00
Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	8.00@ 9.00

Ground Rock

(2000 lb.)

Centerville, Tenn.—B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	4.50@ 5.00
Twomey, Tenn.—B.P.L. 65%	8.00@ 9.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton)

Florida — F.o.b mines, gross ton, 68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—Per ton,	
Mine run	360.00
Clean shop scrap	25.00
Mine scrap	22.00
Roofing mica	30.00
Punch mica, per lb.	.12

Cut mica—50% from Standard List.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars	.....	10.50
Brandon, Vt. — English pink, English cream and coral pink	*11.00	*11.00
Brandon grey	*11.00	*11.00
Brighton, Tenn.—Pink..	6.00	5.00
Mixed pink and bronze	4.50@ 6.00	4.50@ 6.00
All colors, mixed sizes	3.50	3.50
Buckingham, Que.—Buff stucco dash	.....	12.00@14.00
Chicago, Ill. — Stucco chips, in sacks, f.o.b. quarries	.....	17.50
Crown Point, N. Y.—Mica spar	.....	9.00@10.00
Dayton, Ohio	.....	6.00@24.00
Easton, Penn., and Phillipsburg, N. J.	.....	12.00@16.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio—Concrete facings and stucco dash	.....	6.00@24.00
Middlebrook, Mo.—Red..	.....	20.00@25.00
Middlebury, Vt.—Middlebury white	‡9.00	‡9.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags	.....	5.50
Milwaukee, Wis.	.....	14.00@34.00
Newark, N. J.—Roofing granules	.....	7.50
New York, N. Y.—Red and yellow Verona	.....	32.00
Red Granite, Wis.	.....	7.50
Stockton, Calif.—"Natrock" roofing grits	.....	12.00@18.00
Tuckahoe, N. Y.—Tuckahoe white	12.00	.....
Wauwatosa, Wis.	.....	20.00@25.00
Wellsville, Colo. — Colorado Travertine Stone	15.00	15.00

*Carloads, including bags; L.C.L. 14.50.
†C.L. L.C.L. 17.00.
‡Carloads, including bags; L.C.L. 10.00.

Potash Feldspar

Auburn and Topsham, Me. — Color white; 98% thru 140-mesh bags, 22.00; bulk	19.00
Bristol, Tenn.—Color, white; analysis, K_2O, 6 to 10%; Na_2O, 2½ to 4%; SiO_2, 68 to 78%; Fe_2O_3, 12 to 20%; Al_2O_3, 16.5 to 18.5%; 99% thru 200 mesh; bulk, depending on grade	14.50@18.00
Buckingham, Que.—Color, white, analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white, bulk (crude)	9.00
East Hartford, Conn.—Color, white, 95% thru 60 mesh, bags	16.00
96% thru 150 mesh, bags	28.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton..	22.00
Glen Tay Station, Ont.—Color, red or pink; analysis, K_2O, 12.81%; crude (bulk)	7.00
Keystone, S. D.—Prime white; bulk (crude)	8.00
Los Angeles, Calif.—Color, white; analysis, K_2O, 12.16%; Na_2O, 1.53%; SiO_2, 65.60%; Fe_2O_3, .10%; Al_2O_3, 10.20%; crude	10.05
Pulverized, 95% thru 200 mesh; bags, 22.00; bulk	20.00
Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk	20.00
Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude..	7.50@ 8.00

Chicken Grits

Afton, Mich.—(Limestone), per ton	10.00
Belfast and Rockland, Me.—(Limestone), bags, per ton	‡10.00
Brandon and Middlebury, Vt.—Per ton	10.00
Cartersville, Ga.—(Limestone), per bag	2.00
Centerville, Iowa—(Gypsum), per ton..	18.00
Chico, Texas — (Limestone), 100-lb. bags, per ton	8.00@ 9.00
Danbury, Conn.—(Limestone), bulk....	6.00@ 7.00
Easton, Penn.—Per ton, bulk	3.00
Joliet, Ill.—(Limestone), bags, per ton	4.50
Knoxville, Tenn.—Per bag	1.25
Los Angeles, Calif.—(Feldspar), per ton	15.00
Gypsum, Ohio—(Gypsum), per ton....	10.00
Limestone, Wash. — (Limestone), per ton	12.50
Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag	.50
Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk	5.00
Seattle, Wash.—(Limestone), bulk, per ton	10.00
Warren, N. H.—(Mica), per ton	3.85@ 3.90
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.—(Limestone), bulk	‡7.50@*9.00
Wisconsin Points—(Limestone), per ton	9.00

*L.C.L. †Less than 5-ton lots. ‡C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	10.00@11.00
Anaheim, Calif.	10.50@11.00
Barton, Wis.	10.50@13.00b
Boston, Mass.	17.00*
Brighton, N. Y.	19.75*
Brownstone, Penn.	11.00
Dayton, Ohio	12.50@13.50
Detroit, Mich.	17.50*
Farmington, Conn.	13.00
Flint, Mich.	¶12.00@17.50*
Grand Rapids, Mich.	12.50
Hartford, Conn.	14.00
Jackson, Mich.	12.25
Lakeland, Fla.	10.00@11.00
Lake Helen, Fla.	9.50@15.00
Lancaster, N. Y.	12.25
Madison, Wis.	12.50
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis and St. Paul, Minn.	10.00
Minnesota Transfer	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	13.50@14.50
Portage, Wis.	16.00
Prairie du Chien, Wis.	18.00@22.50
Rochester, N. Y.	19.75*
Saginaw, Mich.	13.00
San Antonio, Texas	16.00
Sebewaing, Mich.	12.00
Sioux Falls, S. Dak.	13.00c
South River, N. J.	14.00
Syracuse, N. Y.	18.00@20.00*
Toronto, Canada	11.00@13.50*
Wilkinson, Fla.	10.00@12.00
Winnipeg, Canada	14.00

*Delivered on job. ¶Dealers' price. (b) Delivered to Milwaukee. (c) Delivered at yard.

Portland Cement

Prices per bag and per bbl., without bags, net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.	.86¾	3.47
Atlanta, Ga.	.....	2.35
Baltimore, Md.	.....	2.15
Birmingham, Ala.	.....	2.30
Boston, Mass.	.52¾	2.13
Buffalo, N. Y.	.55	2.20
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa	.....	2.24
Charleston, S. C.	.....	2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio	.58	2.32
Cleveland, Ohio	.....	2.24
Chicago, Ill.	.51¼	2.05
Columbus, Ohio	.57¼	2.29
Concrete, Wash.	.....	2.35
Dallas, Texas	.....	2.00
Davenport, Iowa	.....	2.24
Dayton, Ohio	.58¼	2.33
Denver, Colo.	.66¼	2.65
Des Moines, Iowa	.....	2.05
Detroit, Mich.	.....	2.15
Duluth, Minn.	.....	2.04
Houston, Texas	.....	2.00
Indianapolis, Ind.	.54¾	2.19
Jackson, Miss.	.....	2.50
Jacksonville, Fla.	.....	2.20
Jersey City, N. J.	.....	2.03
Kansas City, Mo.	.....	1.92
Los Angeles, Calif.	.....	2.30
Louisville, Ky.	.55½	2.22
Memphis, Tenn.	.....	2.50
Milwaukee, Wis.	.....	2.20
Minneapolis, Minn.	.....	2.12
Montreal, Que.	.....	1.36
New Orleans, La.	.....	2.20
New York, N. Y.	.48¾	1.93
Norfolk, Va.	.....	2.07
Oklahoma City, Okla.	.....	2.46
Omaha, Neb.	.....	2.36
Peoria, Ill.	.....	2.22
Philadelphia, Penn.	.....	2.21
Phoenix, Ariz.	.81½	3.26
Philadelphia, Penn.	.....	2.11
Portland, Colo.	.....	2.80
Portland, Ore.	.....	2.45
Reno, Nev.	.....	2.91
Richmond, Va.	.....	2.24
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.	.....	2.21
Savannah, Ga.	.....	2.50
St. Louis, Mo.	.51¼	2.05
St. Paul, Minn.	.....	2.12
Seattle, Wash.	.....	2.50*
Tampa, Fla.	.....	2.25
Toledo, Ohio	.....	2.20
Topeka, Kan.	.....	2.41
Tulsa, Okla.	.....	2.33
Wheeling, W. Va.	.....	2.12
Winston-Salem, N. C.	.....	2.62

NOTE—Add 40c per bbl. for bags.
*Ten cents discount for cash, 10 days. (a) Price includes sacks.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Albany, N. Y.	.....	2.15
Buffington, Ind.	.....	1.80
Chattanooga, Tenn.	.....	2.45*
Concrete, Wash.	.....	2.35
Davenport, Calif.	.....	2.45
Detroit, Mich.	.....	2.15
Hannibal, Mo.	.....	1.90
Hudson, N. Y.	.....	1.75
Leeds, Ala.	.....	1.85
Mildred, Kan.	.....	2.35
Nazareth, Penn.	.....	1.95
Northampton, Penn.	.....	1.75
Richard City, Tenn.	.....	2.05
Steelton, Minn.	.....	1.85
Toledo, Ohio	.....	2.20
Universal, Penn.	.....	1.80

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft.	⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Arden, Nev., and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	.....	.....	.....	.....	11.70u	.....	.....	.....
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50	.....	.....	13.50	.....	.....	.....
Des Moines, Iowa	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	.....	.....	.....	.....	14.30o	12.30m	.....	m9.00@11.00o	.....	.....	.....	.....	.....
Delawanna, N. J.	.....	.....	.....	.....	.....	8.00	.....	8.25@9.40	.....	.....	.14½s	.15½s	40.00@41.00
Douglas, Ariz.	.....	.....	6.00	.....	.....	.....	15.00	.....	40.00	13.50	35.00	45.00	.....
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	.....	24.55	20.00	.....	.....	.....
Gypsum, Ohio	3.00	4.00	6.00	8.00	9.00	9.00	20.00	7.00	27.00	19.00	.....	15.00	30.00
Los Angeles, Calif.	.....	.....	7.50@9.50	11.50y	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	11.65m	13.40r	14.40r	.....	15.40r	.....	.....	.....	.....	.....	.....
Seattle, Wash.	6.60	10.00	10.00	13.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	21.50	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross; (d) hair fibre; (f) delivered; (h) delivered in six states; (i) delivered on job; (k) sacks 12c extra, rebated; (m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50; (u) includes sacks; (v) F.O.B. N. Y. C. and dealer's yard in mill locality; (x) Hardwall plaster; (y) sacks 15c extra, rebated.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City or shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	.....	.....
Cement City, Mich.		5x8x12—55.00¶	
Columbus, Ohio	18.00@20.00a	.....	.....
Detroit, Mich.	.16	.....	.18
Forest Park, Ill.	18.00*	23.00*	30.00*
Grand Rapids, Mich.	15.00@16.00a	.....	.....
Graettinger, Iowa	.18@ .20	.....	.....
Indianapolis, Ind.	.13@ .15†	.....	.....
Los Angeles, Calif.¶	5¾x3½x12—55.00	7¾x3½x12—65.00	
Oak Park, Ill.	18.00	.....	.....
Olivia and Mankato, Minn.	9.50b	.....	.....
Somerset, Penn.	.20@ .25	.....	.....
Tiskilwa, Ill.	.16@ .18†	.....	.....
Yakima, Wash.	20.00*	.....	.....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton.

Cement Roofing Tile

Prices are net per sq. in. carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	15.00
Green	18.00
Chicago, Ill.—Per sq.	20.00

Cicero, Ill.—Hawthorne roofing tile, per sq.

	Chocolate, Red, Yellow, Gray, and Orange	Green, Blue
French and Spanish†	$11.50	$13.50
Ridges (each)	.25	.35
Hips	.25	.35
Hip starters	.50	.60
Hip terminals, 2-way	1.25	1.50
Hip terminals, 4-way	4.00	5.00
Mansard terminals	2.50	3.00
Gable finials	1.25	1.50
Gable starters	.25	.35
Gable finishers	.25	.35
*End bands	.25	.35
*Eave closers	.06	.08
*Ridge closers	.05	.06

*Used only with Spanish tile.
†Price per square.

Houston, Texas—Roofing Tile, per sq. 25.00

Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00

Waco, Texas:	Per sq.
4x4	.60

Cement Building Tile

Grand Rapids, Mich.:	Per 100
5x8x12	8.00
5x4x12	4.50
Longview, Wash.:	Per 1000
4x6x12	52.00
4x8x12	64.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Grand Rapids, Mich.:	Per 100
5x8x12	7.00
Houston, Texas:	
5x8x12 (Lightweight)	80.00
Pasadena, Calif. (Stone Tile):	Per 100
3½x4x12	3.00
3½x6x12	4.00
3½x8x12	5.50
Tiskilwa, Ill.:	Per 100
8x8	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile):	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.:	
5x8x12	82.00
5x4x12	46.00
5x8x 6 (half-tile)	41.00
5x8x10 (fractional)	82.00
Yakima, Wash. (Building Tile):	
5x8x12	.10

Cement Drain Tile

Graettinger, Iowa—5 to 36 in., per ton	8.00
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile, per ft.:	
3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waukesha, Wis.—Drain tile, per ton	8.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	.....
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@75.00
Milwaukee, Wis.	15.00	28.00@50.00
Mt. Pleasant, N. Y.	.....	14.00@23.00
Oak Park, Ill.	25.00	*42.00
Omaha, Neb.	18.00	30.00@ 40.00
Pasadena, Calif.	10.00	.....
Philadelphia, Penn.	14.75	20.00
Portland, Ore.	17.50	25.00@ 75.00
Mantel brick—100.00@150.00		
Prairie du Chien, Wis.	14.00	22.50@ 25.00
Rapid City, S. D.	18.00	25.00@ 80.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

†Gray. ‡Red. *Haydenite H. Brick.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.								15.00 per ton									
Graettinger, Iowa	.04½d	.05½	.08½	.12½	.17½	.....	.40	.50	.60	.70	.....	.....	.....	.....	.....	.....	.....
Gr'nd Rapids, Mich. (b)																	
Culvert pipe	.....	.....	.....	.60	.72	1.00	1.28	1.60†	.....	1.92	2.32	3.00	4.00	5.00	6.00	.....	.....
Sewer pipe (d)	.....	.....	.....	.....	.....	.63	.....	.60†	.....	.....	.....	.58	.....	.....	.....	.....	.....
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.80	.90	1.10	1.30	.....	.....	1.70	.....	2.70	.....	.....	.....	.....	.....
Longview, Wash.								Sewer pipe 40% off list; culvert—list									
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.								6 in. to 24 in., $18.00 per ton									
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Olivia, Mankato, Minn.								12.00 per ton									
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiskilwa, Ill. (rein.) (a)	.....	.....	.....	.65	.75	.85	1.10	1.60	.....	1.90	.....	2.25	3.40	.....	5.50	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78
Yakima, Wash.								$10.00 per ton									

30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced. (d) Eastern clay, list, 72% and 60% off.

21-in. diam. ‡Price per 2-ft. length. (d) 5-in. diam. [1]@1.08. [2]@1.25. [3]@1.65. [4]@2.50. [5]@3.85. [6]@5.00 [7]@7.50.

Recent Contract and Bid Prices

Green Bay, Wis. Crushed stone purchase held up by city council. Bids expected to be: Leathem D. Smith, Sturgeon Bay, Wis., $1.20 per ton, delivered on municipal dock and from local dealers, $1.50 per ton delivered on city trucks. About 4500 tons of stone will be required.

Portland, Ore. The following contracts were awarded recently by the county commissioners:

Crushed rock delivered in hoppers on bank of Smith's landing, Sauvies Island, City Motor Trucking Co., 1500 cu. yd. 3-in. rock, $1.85 per yd.; 500 yd. 1-in. rock, $2 per yd. and 500 yd. screenings, $2 per yd. Rock delivered on Rocky Point road, City Motor Trucking Co., 400 yd. 3-in. rock, $2.40 per yd.; 100 yd. 1-in. rock, $2.25 per yd., and 100 yd. screenings, $2.60 per yd. Rock delivered on banks of Columbia slough at north end of Getz road, Star Sand Co., 1600 yd. 3-in. rock, $2 per yd.; 750 yd. 2-in. rock, $2.30 per yd. and 250 yd. screenings, $2.45 per yd.

Patents New Pavement

FRANK LANHAM, president of the Texas Road Co. and former Texas highway commissioner, is reported to have obtained a patent on a new kind of pavement called "Armorcrete." The new pavement is of concrete base with 1-in. sized crushed stone pressed into the base while it is soft. This is said to enable the asphalt surface to stick without slipping.—*Dallas* (Tex.) *Dispatch.*

Establishes Manufacturing Plant in Canada

A COMPLETE manufacturing plant is to be placed in operation June 1 by the Stephens-Adamson Mfg. Co., at Belleville, Ontario. From this branch factory there will be supplied the entire S-A conveying machinery line for the Canadian trade, in addition to a general export business to foreign markets. G. A. Freeman, for 15 years associated with the main organization in an executive capacity at Aurora, Ill., will be in charge of the new plant.

Sand-Lime Brick Production and Shipments in April

THE following data are compiled from reports received direct from 24 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is four less than those furnishing statistics for the March estimate published in the April 16 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having over two-thirds the production capacity in the United States and Canada.

A direct comparison of production, shipments, stocks, etc., against the previous month is not quite possible, on account of the lesser number of reports received. However, making allowance for these plants, it seems logical to believe that the upward swing is continuing and will continue for the next half year or so. At the same time several producers have just started production and data from them will be available soon.

Manufacturers' quoted prices were about the same as the past month. The following are the average prices quoted for sand-lime brick in April:

Average Prices Received in April

Shipping point	Plant price	Delivered
Detroit, Mich.	.....	$16.00
Buffalo, N. Y.	$12.25	16.50
Hummelstown, Penn.	11.00	.....
Toronto, Ont., Can.	11.50	13.50
Hartford, Conn.	14.00	19.00
Boston, Mass.	.....	16.00
Rochester, N. Y.	.....	19.75
Sebewaing, Mich.	10.50	.....
Michigan City, Ind.	11.00	.....
Milwaukee, Wis.	10.50	13.00
Grand Rapids, Mich.	.....	.....
Atlantic City, N. J.	14.00	.....
Toronto, Ont., Can.	.....	13.50
Sioux Falls, S. D.	12.00	Local
Albany, Ga.	10.00	.....
Minneapolis, Minn.	10.00	12.75
Madison, Wis.	12.50*	.....
New Orleans, La.	.....	.....
Syracuse, N. Y.	18.00	20.00
Menominee, Mich.	11.00	14.50
Jackson, Mich.	12.25	.....
Dayton, Ohio	12.50	.....
Lake Helen, Fla.	9.75	13.50
Detroit, Mich.	.....	17.00

*Less 50c 10 days.

The following statistics are compiled from data received direct from 28 producers of sand-lime brick in the United States and Canada:

Statistics for March and April, 1927

	March*	April†
Production	16,748,000	15,004,027
Shipments (rail)	7,707,000	6,229,545
Shipments (truck)	10,811,000	10,884,650
Stocks	13,802,000	8,493,381
Unfilled orders	25,415,000	18,413,200

*28 plants reporting.

†Incomplete, three plants not giving data on stocks and six plants not giving unfilled orders.

New contracts for brick are reported from the Paragon Plaster Co., Syracuse, who are supplying the new school at Canastota, N. Y., and the county school at Manlius, N. Y. The Sioux Falls Pressed Brick Co., Sioux Falls, S. D., are furnishing about 250,000 sand-lime brick for backing up a solid brick wall at the John Morrell and Co. packing house in that city. Undoubtedly there have been other contracts made by producers but they have not been reported.

Standard Lime Company (Canada) Expanding

PROBABLY the largest lime manufacturer in Canada is the Standard Lime Co. of Joliette, Que. The company operates two of the most modern lime plants in the industry, producing high calcium lime suitable for building and chemical requirements from an 8-kiln plant at St. Marc and a 20-kiln operation at Joliette, Que. A portion of the company's production, in addition to being sold in the form of quicklime, is also hydrated and sold under a trade name.

Under the direction of its managing director, E. E. Lepine, the company, from a small beginning, has in 25 years developed into a strong institution which has contributed to the development of the city of Joliette. In addition to its lime manufacturing business, the company also operates one of the largest stone crushing plants in the province of Quebec, the only stone crushing plant between Montreal and Quebec cities on the north shore line of the Canadian National Railway.

Seven years ago the Standard Lime Co. went into the sand producing business and organized a subsidiary to acquire and operate nearly 1200 acres of sand suitable for all building requirements. The name of this subsidiary is the Standard Sand, Ltd., and is now an important branch of the parent company's operations. Seventeen cranes are required to handle the daily output. In addition to sand the subsidiary also produces prepared and washed gravel, and last year added a modern screening and washing plant.

Another subsidiary of the Standard Lime Co. is the Lime Products, Ltd., of Montreal, which under well-known patented processes manufactures ready-mixed lime mortar and sand-lime brick. A description of the sand-lime brick plant was published in ROCK PRODUCTS, December 25, 1926, issue.

Sand-Lime Brick Production in 1926

THE Department of Commerce announces that, according to data collected at the annual census of sand-lime brick production taken in 1927, 42 establishments, which were in operation on an average of 217 days in the year, reported the production in 1926 of 330,586,000 of brick, valued at $3,981,492. This represents increases of 4.8% in quantity and 5.3% in value, as compared with 315,595,000, valued at $3,780,639, reported for 1925, and of 16.6% in quantity and 19.4% in value, as compared with 283,417,000, valued at $3,334,503, reported for 1924.

Summary statistics are presented in the following statements. The figures for 1926 are preliminary and subject to such correction as may be found necessary upon further examination of the returns. The data given below in tables I and II include comparative statistics for preceding years which have been revised wherever possible.

TABLE 1. PRODUCTION BY QUANTITY AND VALUE, STOCKS ON HAND BY QUANTITY, FOR THE UNITED STATES: 1926, 1925 AND 1924

	1926	1925	1924	% inc. or decr. (—) 1925–26	1924–25
Number of establishments†	42	42	37	(*)	(*)
Sand-lime brick:					
Production	330,586,000	315,595,000	283,417,000	4.8	11.4
Value	$3,981,492	$3,780,639	$3,334,503	5.3	13.4
Stocks on hand on December 31	22,033,000	23,599,000	21,717,000	—6.6	8.7

*Not computed where base is less than 100.

†California, 1 establishment; Connecticut, 1; District of Columbia, 1; Florida, 3; Indiana, 1; Louisiana, 1; Massachusetts, 2; Michigan, 13; Minnesota, 4; New Jersey, 3; New York, 3; Ohio, 2; Pennsylvania, 2; South Dakota, 1; Texas, 2, and Wisconsin, 2. Of the 42 establishments reported as having produced sand-lime brick in 1925, 3 were reported as out of business and 1 as idle in 1926. Four new establishments reported production for 1926.

TABLE 2. SAND-LIME BRICK—PRODUCTION, STOCKS ON HAND, AND AVERAGE NUMBER OF DAYS IN OPERATION, FOR THE UNITED STATES, 1914 TO 1926, AND FOR STATES, 1926

State	Production		Stocks on hand	Avge. number of days
United States:	Quantity	Value	Dec. 31	in operation
1926	330,586,000	$3,981,492	22,033,000	217
1925	315,595,000	3,780,639	23,599,000	(*)
1924	283,417,000	3,334,503	21,717,000	(*)
1923	213,425,000	2,471,536	(*)	(*)
1921	97,126,000	1,268,502	(*)	(*)
1919	†146,947,000	†1,705,163	(*)	(*)
1914	†172,629,000	†1,058,512	(*)	(*)
Florida	19,743,000	223,896	379,000	275
Michigan	108,434,000	1,341,284	6,424,000	260
Minnesota	12,389,000	124,265	2,855,000	129
New Jersey	49,854,000	585,703	1,630,000	254
New York	11,510,000	158,283	2,058,000	183
Other states:‡				
(Connecticut, District of Columbia and Mass.)	58,944,000	764,197	2,638,000	264
(Indiana, Ohio and Pennsylvania)	32,412,000	375,956	4,536,000	178
(Louisiana and Texas)	12,211,000	151,778	309,000	271
(California, South Dakota and Wisconsin)	25,089,000	256,130	1,204,000	222

*No data.

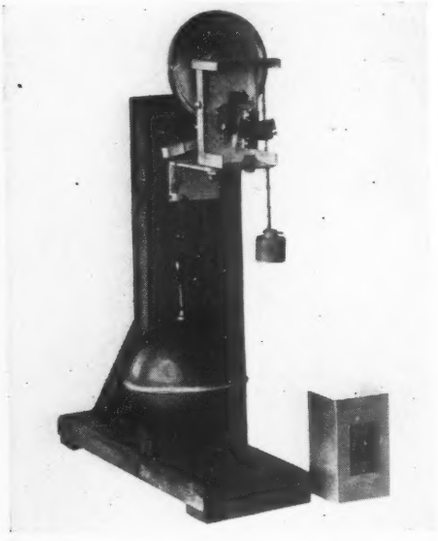
†Marketed. (Data obtained from reports of United States Geological Survey.)

‡Statistics for these states cannot be shown separately without disclosing the operations of individual establishments, but some of them reported larger values of products than were reported by some of the states shown separately.

New Machinery and Equipment

New Float Switch

THE General Electric Co., Schenectady, N. Y., announces a new float switch bearing the designation CR-2931-P, for use in control circuits only. This switch, in general, will be used to control the line contactor of alternating or direct current automatic starters. It has a rated capacity for handling one 600-amp., two 300-amp. or four 150-amp. a-c. or d-c. contactors at from 110 to 550 volts.



New float switch for control circuits

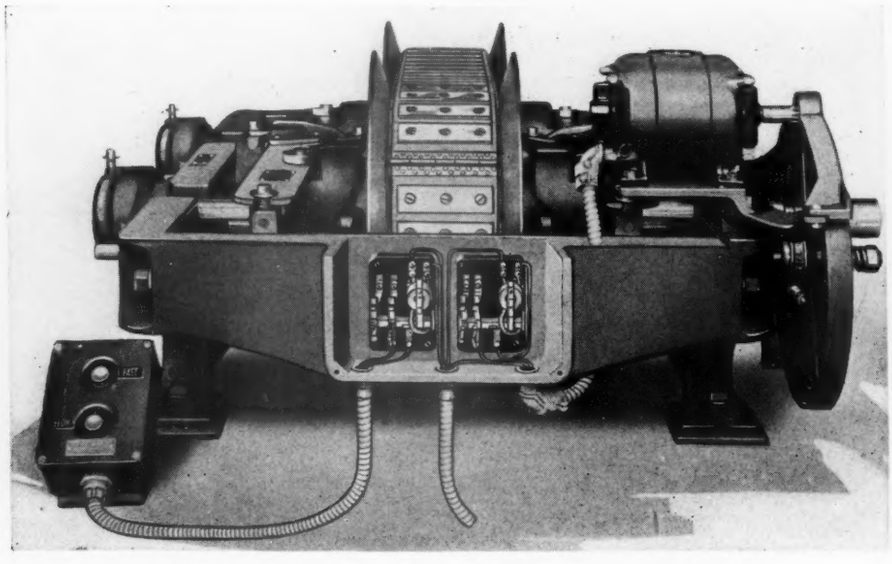
A very simple design is employed. No castings are used. A double contact eliminates shunts, and oxidation trouble is claimed to have been eliminated by the use of silver contacts. The movable contacts are held by a moulded bakelite arm which obtains its snap action in opening and closing the switch through a special mechanism.

The switch may be attached directly to a support extending across the tank or by means of a side bracket supplied with it. This bracket is reversible and provides for various methods of fastening. The case, which is splash-proof, has provision for a ½-in. conduit at the top.

New Electrical Remote Control on Variable Speed Transmission

A NEW electrical remote control for its variable speed transmission is announced by the Reeves Pulley Co., Columbus, Ind. Through its use, economies in operation are effected, the manufacturers say, it being possible to locate one or more push buttons controlling the speed of the machine at any distance from the transmission itself. This allows the operator of, for example, a wallboard board machine to remain at his position near the squeeze rolls and direct the travel of the board machine from this position, providing, of course, that the machine is driven through this transmission device.

The remote electrical control consists of a fractional horsepower reversible motor mounted on a bracket above the shifting screw of the Reeves transmission, and connected to the shifting screw by a single reduction of spur gears. This motor is started in either direction by one or more push-button stations operating through a magnetic switch. Since the motor is of fractional horsepower for Reeves transmissions up to and including the No. 7 size, it is generally possible to use the regular lighting circuit, although of course any circuit can be used. For protection in case the operator should hold the push button beyond the slow or fast limits of speed, a patented safety clutch prevents jamming of the motor or transmission.



Variable speed transmission device with remote control

New Spur-Gear Speed Reducer

THE Stephens-Adamson Co., Aurora, Ill., has recently announced the extension of its manufacturing to include gears of all types, cast and cut. Along with these lines, speed reducers in varying sizes, of the spur and worm types, are also being made. The introductory reducer is called the "Speeducer," a machine fitted with spur gears enclosed within an oil-tight housing,

New spur-gear speed reducer

ratios up to 2000: 1 for standard sizes and rated capacities varying from one to 300 hp.

Some of the advantages claimed for these machines are: (1) Space—For a given ratio tha "Speeducer" is said to be more compact than the open gear train. (2) Quiet—Proper alignment, the gears and shafts being all mounted in a single rigid case. (3) Safety—All the gears are operated within a housing which eliminates open gear hazard and gear guards. (4) Lubrication—All gears operate in a bath of oil at all times. (5) Long service life—Correct alignment and thorough lubrication adding materially to the life of cut gears.

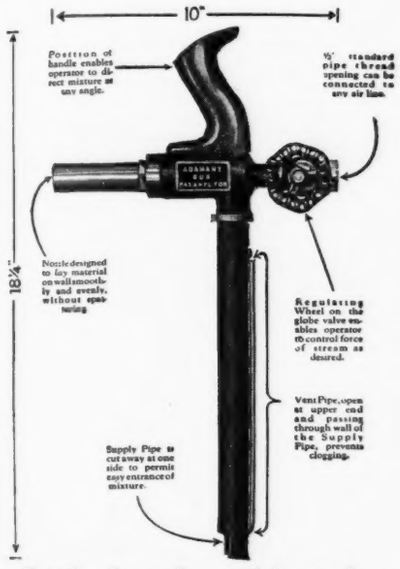
The substantial design and construction of the machine permits dependable speed reduction service for long periods, it is said.

New Gun to Apply Surface Coatings on Refractory Linings

THE Botfield Refractories Co., Philadelphia, Penn., has recently brought out the "Adamant" gun for applying surface coat-

ings or "facings" on refractory linings of rotary kilns used in cement manufacture, and also in lime kilns, boiler furnaces and other refractory construction.

By this new method, it is said, linings can be returned to good condition whenever the equipment is out of service for a short time. Sometimes, the repairs can be made without interrupting the operation of the equipment. Cracks, crevices, joints and brick pores can be filled up, quickly and efficiently and burned-out sections and depressions can be patched, the manufacturers say, with this



Details of gun for applying surface coatings to refractories

device. Walls can be maintained at their original thickness, it is claimed, with a smooth uniform surface presented to the attack of flame and other destructive elements encountered in operation.

Wet or dry material can be applied as a surface coating by the gun. The weight of the device is given as 4 lb. and only one man is said to be required for operation.

Showing method of applying wet refractory surface material with new gun

Steel spud with removable sheave for gravel dredges

It uses air or steam at 50 lb. pressure or more. As air is more satisfactory in results, its use is recommended wherever possible. The operator simply connects the air line to the ½-in. standard pipe thread opening on the globe valve of the gun, places the supply pipe in the pre-mixture, turns the globe valve, and the gun sprays the pre-mixture, smoothly and evenly on the structure. Consistently used, the manufacturers say, this method will keep furnace linings in excellent condition—eliminating many a relining and effecting appreciable savings in refractory repair costs.

Steel Spud for Gravel Dredges

A NEW steel spud for gravel dredges is now being manufactured by Hetherington and Berner, Indianapolis, Ind. This is for use on new dredges or in replacing the old timber spuds. The spud shown is 20 in. square, 60 ft. long and weighs between 6 and 7 tons. The points are of semi-steel. It has a removable sheave 12 ft. from the point through which the lifting cable runs.

Several advantages in economy and time-saving are claimed for the steel spud. It is claimed to hold the barge absolutely steady even under heaviest strains, thus giving it is said greater leverage and efficiency and eliminating all danger of failure in service. The lifting-cable raises the spud quickly and easily and after the barge is moved to its new location, the spud is released, sinking by its own weight into a rigid footing in the floor of the pit the manufacturers say.

New Floodlight Projector

A NEW 24 in. floodlight projector, known as type SCA-24, has been developed by the Westinghouse Electric and Manufacturing Co., particularly for yard lighting, night quarry or pit operation and similar applications where long throw and high beam candle-power are essential. The large diameter of the reflector in the new floodlight is said to make possible a wide angle of light with high overall efficiency. Its long focal distance gives good beam concentration for long range work.

The 24 in. parabolic chromium plated brass reflector is mounted in a cast aluminum alloy frame with a spun sheet aluminum back. The lens, of heat resisting glass, is held in a door which opens from the front swinging sideways. Thus, it is possible to renew lamps and clean the reflector without interference from the door.

The floodlight is mounted so that it can

New 24-in. floodlight projector for night quarry or pit operation

be tilted upward where its position is such that approach from the front is not practical. A stop is provided so that it is unnecessary to aim the projector each time it is moved from position. Focal adjustment is provided by three screws, which operate independently, two for "in" and "out" and lateral motion of the lamp, and one for adjustment of focal distance.

The reflector is entirely enclosed, no ventilation being required. It is furnished with either narrow or wide beam projector and with either a plain or spread lens. The visor is supplied as an accessory.

Leslie Rock Company Buys Williston, Fla., Quarry

THE crushing plant formerly owned by L. E. Leslie, J. W. Nunnelley, J. H. Perry, known as the L. N. and P. Lime Rock Co., has been purchased by L. E. Leslie, one of the former owners. The business will be in the future run under the name of the Leslie Rock Co. and will be operated in connection with his engineering business.

This is one of the new plants in Williston, Fla., and never has been operated, as the tracks have only lately been completed and operation made possible. Quarrying operations are reported to have been started under the new management.

This crushing plant is one of the newest and equipped with all modern machinery. It is being operated with a Fairbanks-Morse engine, but a power line is being erected to the plant by the Florida Power Corp. and as soon as this is completed the plant will be operated by electricity.—*Williston* (Fla.) *Sun.*

Commonwealth Sand Co. Buys Additional Property

SALE of property formerly occupied by a dairy farm about three-quarters of a mile from Richmond, Va., on the Darbytown road, in Henrico county, and on which sand and gravel recently was discovered, for $95,000, is reported in the *Richmond* (Va.) *Times-Dispatch.*

The Commonwealth Sand and Gravel Co. was the purchaser. The property formerly was owned by G. N. Farrand of Henrico county.

Extensive alterations and additions, it is understood, will be made to the property, and what is said to be the first electrically operated plant of the kind in Virginia shortly will result from the improvements to be made. The plant also will be one of the largest of its kind in the Old Dominion, it is said.

Active operations under the new ownership and management are said to have been started. The capacity will be increased from the present two cars a day to 20 cars of washed gravel and 40 cars of sand-clay gravel daily, the report states.

Oklahoma Survey on Road Materials

A SURVEY of the road building materials, particularly of the region of the southwestern part of the state, will be started this summer by the Oklahoma Geological Survey, Dr. C. N. Gould, director, announced. The survey will be conducted in co-operation with the state highway department, and tests of materials found will be made in the department's laboratories in Oklahoma City.

Samples of limestone, granite, conglomerates, gravel, sand and other materials will be collected and sent in for test and their sources and deposits will be studied.

"There is enough road building material in the Wichita mountain region to build all the roads in Oklahoma for hundreds of years," Dr. Gould said, "and the object of this survey will be to locate those deposits and study the supply and accessibility. Great quantities of sand and gravel are known to exist in the beds of East and West Cache, Medicine Bluff, Otter and Post creeks and thousands of tons of this material is within a short distance of the railroad."

It is not known when the materials located this summer will be used, but it is believed that the southwestern section will be investigated first to prepare for a great road building program in the western part of the state within the next few years.—*Lawton* (Okla.) *Review.*

Mirabel Gravel Company to Increase Capacity

THE Mirabel Gravel Co. has begun construction and installation of $12,000 worth of new equipment at its plant just west of Mirabel Park, Santa Rosa, Calif., Fred Larsen, manager, announced recently in the *Santa Rosa* (Calif.) *Democrat.*

An 80-ft. steel mast will be strung with high lines and steel cables extending to a deadman 700 ft. into the Russian river. A dragline bucket system will be used to remove the sand and gravel from the river bottom. This will empty into a large bin on the river bank where it will be drawn as needed and put through the washers and screens and sized into pea sand and gravel to be used for road and building construction.

The company has acquired 1800 ft. of spur track, and Larsen estimates that an average of 10 cars of sand and gravel will be shipped daily.

Investigate Large Deposits of California Limestone

A LIMESTONE deposit at the head of a canyon east of Soboba Springs, near Hemet, Calif., with an estimated 32,000,000-ton deposit in sight for development, was investigated recently by George H. Briggs, Los Angeles mineral land broker, and H. O. Hinshaw, mineral representative of the Riverside County chamber of commerce, for prospective purchasers. The deposit is the property of Charles Sims.

Specimens from the deposit are said to have received a kiln test by a New York concern and to have made a good lime.

It is rumored that the United States Steel Corp., a cement company with headquarters in St. Louis, Mo., and a fertilizer concern of San Francisco, are all interested in the deposit.

Another deposit in the Baptiste canyon also investigated was said to be found of good quality.—*Hemet* (Calif.) *News.*

Heinrich Julius Müller

THE recent death of Heinrich Julius Müller marks the passing of a figure who for the past 40 years has been prominently associated with the development of the German portland cement industry. Born in Peine, 65 years ago, Dr. Müller obtained his early schooling near that place, later completing his studies at Munich, Gottingen and Berlin under August Wilhelm von Hofman in 1887. He specialized in chemistry and geology, which later he applied to a great degree in research. In 1888 he started on his long and successful career in the cement industry, his first position being that of manager of the cement mills at Stettin-Gristow and Zossen. With the acquisition of the Rudersdorf mill of the R. Guthman and Jeserich Co. by the Adler Portland Cement Co. of Zossen, Dr. Müller's managerial duties were enlarged. It is interesting to note that he continued as manager of this plant until the time of his death.

In 1906, Dr. Müller was elected to the board of the German Portland Cement Association and three years later, 1909, was elected president, which office he held to the time of his death, a period of 18 successive years. The scientific progress of the association is closely interwoven with Dr. Müller's efforts. He was the first to recognize that efficient operation and service went hand in hand and this led him to establish in 1911 the central committee for the promotion of the German portland cement industry which in 1917 was merged with the German Cement Union.

The convention and technical reports are replete with scientific papers contributed by Dr. Müller, sufficient proof that he was not only an energetic executive but also a stimulating influence on cement research. His activities in the field of silicate chemistry were long recognized and he was considered one of the foremost authorities on this branch.

Dr. Müller's work was recognized far beyond Germany. He was a member of various educational boards at Berlin and Dresden and for a number of years was special lecturer at the Technischen Hochschule, Berlin, one of the greatest engineering institutions in all Germany. The honorary degree of Dr. Ing. e. h. was conferred upon him by the Technischen Hochschule, Hannover, by way of acknowledgment of the contributions he had made to the advancement of science.

Dr. Müller was never too busy to extend assistance to the deserving. His friendliness and interesting personality won for him many friends in professional and lay circles. Perhaps the best appreciation of the man and his work is expressed by a German contemporary—"May the future bring to it (the German cement industry) a leader as deserving as Dr. Müller."

[This obituary of Dr. Müller was written by Dr. C. R. Platzmann, who is a valued contributor to ROCK PRODUCTS.]

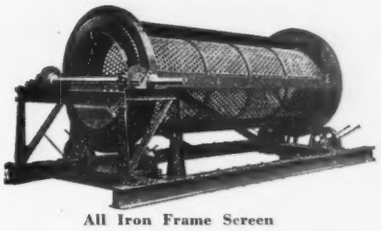
Crushing Plant Equipment

The many crushing plants which have been completely equipped by the Allis-Chalmers Manufacturing Company is evidenced by the satisfactory service which these plants are giving. The Allis-Chalmers Manufacturing Company takes the entire **responsibility** for the design of the plant and its equipment. These plants are built on the highest engineering standard following the best engineering practices.

Our Engineers are at your service to make complete installation drawings

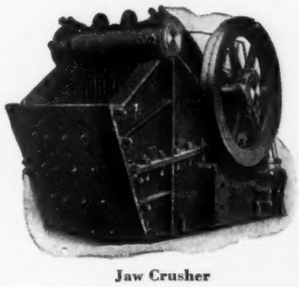
Gates No. 27 Gyratory Crusher, having two openings, each 54 in. x 141 in.

The Gates Style K Crusher, which has been developed in all sizes, is the result of 40 years' accumulated experience of the engineers and designers of the Gates Iron Works and the Allis-Chalmers Mfg. Co.



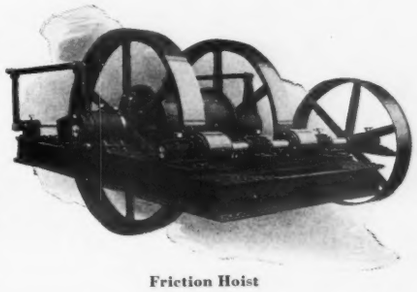
All Iron Frame Screen

The durability, simplicity and efficiency of the Gates Patented All-Iron Frame Screens is unequalled by any other screen on the market.



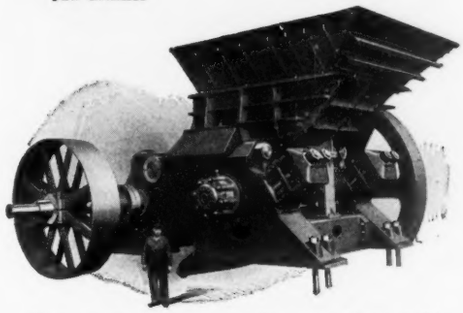
Jaw Crusher

The company has also developed in all sizes Jaw Crushers for crushing copper ore, blast furnace flux and ballast stone.



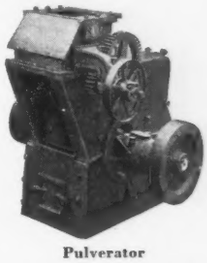
Friction Hoist

Friction hoists are the simplest and most effective devices for handling dump cars in a crushing plant. They are constructed single and double friction, with a maximum drum diameter of 36″.



60 in. x 48 in. Fairmount Type (or Single Roll) Crusher

The Fairmount Crusher is intended to crush limestone, dolomite, phosphate rock, magnesite and other less tenacious rocks. It is not suitable for, nor do we recommend it for granites, trap rock or other igneous rock.



Pulverator

The Allis-Chalmers Pulverator is a crushing and pulverizing machine designed on a new principle. It is designed as a crusher for the reduction of material from 3 inches or finer to a size of which all will pass a 20-mesh screen if necessary. The materials which it handles to advantage include limestone for cement making, concrete, agricultural purposes, etc., coal, shale, felspar, phosphate rock, gypsum, bauxite, slag and similar substances.

Write for Our Bulletins

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Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

News of All the Industry

Incorporations

Tri-State Talc and Mineral Corp., Glen Gardner, N. J., $100,000.

Lee Van Orman Sand and Gravel Co. of Yoakum, Texas, has changed its name to the West Point Co.

Lone Star Gravel Co., Houston, Texas, $40.000. By H. G. Bryan, T. F. Bryan and Mrs. Addie I. Bryan.

Waterseal Concrete Shingle Co., 108 Frederick St., Cumberland, Md., $25,000. By John A. Anderson, Frank A. Stein and Bernard A. Farrell.

J. E. Carroll Sand Co. of Buffalo, N. Y., has increased its capital stock from $100,000 to $750,000.

Federal Sand and Gravel Co., Westville, N. J., $100,000 preferred and 1500 shares of common stock.

Sand Point Gravel Co., Seattle, Wash., $145,000. By Albert E. Parker, C. L. Johnson and E. S. Parker.

Olympia Sand and Gravel Co., Olympia, Wash., $30,000. By Minnie E. Martin, G. D. Martin and John Bustrack.

Illinois Gravel and Construction Co., Rutland, Ill., $150,000. Deal in gravel. By John R. Cox, Lura Cox, John R. Cox, Jr., and H. P. Haley.

Clematis Brook Sand and Gravel Co., Waltham, Mass., $25,000. By Delbert S. Smith of Weston, Charles H. Hodge and John S. Lovell of Watertown.

Formburn Co., Inc., Jacksonville, Fla., $100,000. To manufacture cement brick, etc. By George F. Formby, Clayton Washburn, St. James Bldg., and Louise B. Washburn.

Duntile Cement Products Co., Inc., Charlotte, N. C., $20,000. To manufacture and deal in cement tiles. By W. Albert Brown, Vila Lee Brown and A. B. Brown, all of Charlotte.

Formisano & Sons, Jersey City, N. J., $100,000. To manufacture artificial stone. By Michael Formisano, Phillip Caroselli and Jacob Friedland, all of Jersey City.

Nolte & Johnson, Inc., Bellingham, Wash., $90,000. To manufacture artificial stone and deal in sand, gravel and building material. By George V. Nolte, Kirk Johnson and James H. Spencer.

Cedar Grove Sand Co., Fremont, Neb., $25,000 by 2500 shares at $10 each. To carry on general sand and cement block manufacturing business. By J. A. Patton, Joe Becker, Guy C. Patton and W. S. Bailey.

White River Materials Co., Hazelton, Ind., $25,000. To operate a gravel pit and deal in building materials. By Charles A. Steele, Henry P. Phillips, Charles W. McFetridge and L. F. Sullivan.

Atlantic Gravel and Supply Co., Atlantic City, N. J., $50,000. Deal in gravel. By Robert E. Steedle, Floyd S. Sumner and Catherine C. Collins, all of Atlantic City. (Attorney, C. C. Shinn, Atlantic City.)

Avoca Quarries Corp., Bedford, Ind., $50,000 preferred stock and 2500 shares of no par value. To carry on a general quarrying and stone manufacturing business. By Andrew Ziegler, Ben Bridwell, Rollie A. Tindall and John Ogden.

Quarries

Black Marble and Lime Co., Enterprise, Ore., is said to have engaged E. W. Lazell, consulting engineer of Portland, to work on the revised plans for their new plant at this place. The company plans to erect four kilns along the railroad track. The rock will be brought down the mountainside by an aerial tramway.

France Stone Co. has begun the production of crushed stone at Monroe, Mich. This plant was destroyed by fire about a year ago, but was recently rebuilt.

Eagle Pass Lumber Co., Eagle Pass, Texas, is in the market for limestone quarry equipment to be used in Mexico, it is stated.

Durham, N. C. The city quarry here has installed a new rock crusher. This brings the number to three crushers now in operation, supplying the city with crushed stone for street paving work, according to H. W. Kueffner, director of public works.

Maisonneuve Quarry Co., Ltd., Montreal, Canada, recently had its two stone crushing plants destroyed by a fire caused by a short circuit. The loss is estimated at about $300,000.

North Carolina is said to be conducting a survey, through the department of geology of the state college, of every community in an endeavor to find stone and non-metallic mineral deposits for landowners.

Urbana, Ohio, states that the county commissioners in the Jackson-Mad River district have purchased a new jaw crusher, making a total of 5 county-owned rock crushers supplying stone for road work in this district.

Southern Limestone Co., Harriman, Tenn., recently purchased a new quarry.

Chitwood, Ore., reports that the state highway department has completed the work of sluicing off the dirt and small rock in their quarry operation at that place.

Centre Hall, Penn., reports that C. A. Spyker is again operating his quarry at this place after a long shutdown.

Coachella, Calif., reports that the county rock crusher near Point Happy has been put into operation to supply stone for road work.

Sand and Gravel

Gordon Sand and Gravel Co. is the new company said to have been recently organized in Denver, Colo., to carry on a washed sand and gravel business. Its pits are located on the outskirts of the city, it is stated.

J. B. Lusk, Ponca City, Okla., is reported to have lately organized a company under the name of the River Sand Co., with offices at his home.

J. W. Hoopes, Denbigh, Va., is said to be in the market for a gravel washing and handling plant.

Pasco, Wash., is reported to have a new sand and gravel company, organized by E. M. Brown recently.

Pinkston Sand Co., Michigan City, Ind., is said to have filed a preliminary certificate of dissolution with the secretary of state recently.

Eau Claire Sand and Gravel Co. reports that its new sand and gravel plant near Gravel Island, Wis., has been completed and is in operation.

Dillon, S. C., is to have a new sand and gravel operation, to be started by William Knetsch, who is installing new machinery on the 160-acre tract he recently purchased, it is stated.

Arrow Sand and Gravel Co., 79 E. State St., Columbus, Ohio, plans the erection of a $200,000 storage and distributing plant at 555 Furnace St., with steel tipple and other equipment, it is stated.

Cedar Rapids Sand and Material Co., Cedar Rapids, Iowa, has engaged W. S. Keller, of the Empire Sand and Gravel Co., to build its new, modern sand and gravel plant at Cedar Rapids, it is said.

Salt Lake City, Utah, city commission recently passed an ordinance prohibiting the operation of gravel pits, including rock crushers and other related equipment, in the Wasatch Blvd. section as far east as H St.

Rutland, Ill., is said to have a new sand and gravel company recently incorporated by John R. Cox under the name of the Illinois Gravel and Construction Co. Mr. Cox also is reported to have started the operation of the Rutland-Granville branch railroad, abandonded by the Chicago & Alton, under the name of the Rutland, Toluca & Northern and incorporated for $100,000.

Pioneer Sand and Gravel Co., Edmonds, Wash., has completed its Richmond Highlands plant and carries a full line of sand, gravel, lime, cement, metal lath and beading. The company is also prepared to supply their "Ready to Pour Tru Mix Concrete" from the Westlake plant.

Umpqua Dredging and Construction Co., Reedsport, Ore., reports that it has received the order to furnish Coos county with gravel for use in road work. A new bucket dredge has been purchased by the company.

Burlington, Wis. The Soo Line gravel pit at Honey Creek has started operation. A new derrick, steam shovel and motor trucks have been put into service, it is stated.

P. and T. Sand and Gravel Co., Milwaukie, Ore., reports that the half interest in the company owned by Frank Tubandt has been sold to John Kullander of Independence.

Tomahawk, Wis., reports that the gravel pit here has been opened, as also the one on highway 51, near here. The gravel is to be used on the federal road job between Tomahawk and Gilbert.

Billings, Mont., reports that Fred Hilgert and the board of county commissioners have made an agreement whereby the county will pay $100 for the right to secure gravel from his pit, located near here.

Burlington, Wis., recently reported that Richard F. McPartlin had obtained an option on property here, with a view to forming a corporation, under the laws of Illinois, for the purpose of operating a gravel pit and quarry.

Cement

Texas Portland Cement Co., through William Moeller, general superintendent, announced that the Dallas and Houston, Texas, plants had signed enrollment papers pledging their support in the national no-accident campaign to start June 1.

San Antonio Portland Cement Co., San Antonio, Texas, the winner of the first safety trophy offered by the Portland Cement Association in 1923, hopes to dwarf its past records by the local safety campaign it is planning.

San Antonio Portland Cement Co., San Antonio, Texas, has let the contract for steel to be used in the construction of plant additions, it is said.

Boston, Mass., reports the arrival of the Norwegian steamer "Torsol," Captain Nygaard, from Antwerp, loaded with Belgian cement.

Northwestern Portland Cement Co., Seattle, Wash., recently let the contract for the construction of the 250-ft. concrete stack at its Grotto, Wash., plant to the Webber Chimney Co. of Chicago, Ill.

Indiana Portland Cement Co. recently sent 150,000 empty cement sacks from its Greencastle, Ind., plant to New Orleans. They will be used when filled with sand or earth to reinforce the levees along the Mississippi river in the flood area.

Phoenix Portland Cement Co. will be host to the Birmingham, Ala., Lions club at a luncheon and inspection tour at their plant soon, it is stated.

Knickerbocker Portland Cement Co. was the host recently at its Hudson, N. Y., plant to about 100 engineering students of Rensselaer Polytechnic Institute, as part of their course in concrete and building materials.

Pacific Portland Cement Co., San Francisco, Calif., the recently organized $30,000,000 corporation which is a merger of the Old Mission Portland Cement Co. and the Pacific Portland Cement Co., Consolidated, is reported to have moved into the new offices on the eighth floor of the Pacific Bldg., San Francisco.

Lawrence Portland Cement Co., Northampton, Penn., has awarded a general contract to the Burrell Engineering and Construction Co., 513 W. Jackson Blvd., Chicago, Ill., for its new mill at Thomaston, Me., to cost in excess of $2,500,000 with equipment, it was recently announced.

Lime Products Co., Home Insurance Bldg., Little Rock, Ark., is reported to be planning the construction of a cement mill to cost in excess of $500,000 with machinery at White Cliffs, Ark. A. M. Lund is engineer for the company.

Alabama Portland Cement Co., Birmingham, Ala., shipped about 500,000 empty sacks recently to be filled with sand and used in the flood areas in Louisiana and Mississippi.

North American Cement Corp., Albany, N. Y., has moved its offices to the top floor of the Albany Garage Bldg., it is announced.

Carolina Portland Cement Co. is said to be making arrangements for the construction of a cement plant at New Bern, N. C., at a reported cost of $3,000,000.

Cement Products

Arnold Stone, Brick and Tile Co., Jacksonville, Fla., has plans for a new one-story plant 100x230 ft., to cost about $60,000 with equipment.

Everett Concrete Products Co.'s plant at Everett, Wash., was recently visited by about 300 boys from the workshops at the North Junior high school.

Gulf Concrete Pipe Co., Houston, Texas, is clearing ground on a 10-acre tract near Brownsville, preparatory to the construction of a concrete drainage and sewer pipe plant to be 80x100 ft. to cost approximately $35,000, it is said.

Milwaukee, Wis. Tests of a "flexible" concrete lighting pole were made recently by the engineers of the Westinghouse Electric and Mfg. Co. A 45-ft. pole of concrete was bent 54 in. out of line with a pull of 6700 lb. without breaking. The pressure was released and the pole resumed its original straightness. The poles are made of scientifically prepared concrete, reinforced with steel.

Thomas Canfield, president of the International Motor Contest Association, is advocating the erection of concrete and steel fences around dirt-track automobile race courses, as the most effective means for the protection of life both to the driver and the spectator.

St. Paul, Minn., city council is reported to be considering an ordinance, for licensing concrete block manufacturers, which provides for a $50 fee and a $5,000 bond for each block manufacturer.

Turner Pipe Works, Bellingham, Wash., recently had a fire at its plant which damaged its dry kiln and several trucks.

Palmyra, Mo., announces the Farm Sanitation Tour, jointly sponsored by the Portland Cement Association and the Missouri College of Agriculture, to take place at an early date. Septic tanks will be built as part of the demonstration of good concrete construction and as a health safeguard. The all-day sessions will be divided by demonstrations of concrete work in the mornings and lectures in the afternoons.

Gypsum

Canadian Gypsum Co., a subsidiary of the United States Gypsum Co., is said to have completed the preliminary work on the plans for the erection of a rock storage plant near Digby, N. S. The new plant will be 600 ft. long by 180 ft. wide, with a storage capacity estimated at 600,000 tons of gypsum rock.

United States Gypsum Co.'s office in Omaha, Neb., has been moved from 1407 Woodman Bldg. to the World-Herald Bldg.

United States Gypsum Co., Chicago, Ill., has purchased 6½ acres of land on Fifty-sixth St. near Eastwick Ave., Philadelphia, Penn., and contemplates the erection of a new mill.

Standard Gypsum Co., Long Beach, Calif., recently received a shipment of 9600 tons of gypsum via boat from San Marcos Island.

Nova Scotia's gypsum industry is on the increase and figures show that approximately 607,116 tons of crude gypsum were quarried and shipped to the United States during 1926, an increase of 135,942 tons over the 1925 exports.

Agricultural Limestone

Lancaster, Wis., reports the finding of extensive deposits of limestone, well suited for agricultural use, and that a pulverizer has been installed by John Napp to supply the farmers in this community.

Louisiana, Mo., and several communities adjacent report an increase in demand for agricultural limestone. Several centrally located crushing plants and storage bins have been erected in the county and receive the pooled orders of the farmers in the community.

Falls City, Ore., reports that the state contemplates conducting an investigation of the lime deposits on the Anuck property near there, with a view of opening an agricultural lime station for the farmers of this district.

Miscellaneous Rock Products

Mount Shasta Silica Co., Redding, Calif., has preliminary plans for the construction of a new plant for the production of refined silica. It is to be one story and will cost approximately $500,000 with machinery.

Asbestos Shingle, Slate and Sheathing Co., Ambler, Penn., announces a new shingle made of asbestos rock fiber and portland cement. This shingle has a rough, uneven surface and tapers in thickness from ½ in. at the butts to ⅛ in. at the upper end. They are made in a variety of nonfading colors and can be laid so as to produce warm tapestry effects. These shingles are fireproof, are not affected by exposure to weather, cannot rot or deteriorate with age; in fact, it is claimed by the manufacturers that they become harder and stronger each year as the cement sets more firmly with age. The Asbestos Shingle, Slate and Sheathing Co. also manufactures the "Colonial" and "English Thatch" type of shingle.

Western Feldspar Milling Co., 1151 S. Ogden St., Denver, Colo., is said to have started erecting the superstructure of a one-story grinding mill to be 55x76 ft. over all.

Kentucky Rock Asphalt Co., Bowling Green, Ky., is increasing the storage capacity of its loading station here, it is said.

Personals

D. Stuart Mossom is said to have resigned his position as assistant state geologist of Florida to accept a position with a prominent oil concern. Mr. Mossom has held this office since 1924 and has written a number of valuable state papers on the geological formations of Florida, as well as investigating the state's mineral resources. He recently finished six months of field work on a revised map covering the geology of Florida.

Walter Moore, Jr., of the Consumers Rock and Gravel Co., Los Angeles, Calif., was recently elected to the board of directors of the Builders Exchange.

Herbert L. Smith, Indianapolis, Ind., has been appointed manager of the Illinois sales territory of the Indiana Portland Cement Co., with headquarters at Champaign, Ill.

Roy Burnett, president of the Monolith Companies, which are erecting the Monolith Midwest Portland Cement plant at Laramie, Wyo., with Mrs. Burnett and family have left for a vacation cruise to Hawaii.

Frank H. Smith, president of the Lawrence Portland Cement Co., left for Europe, May 21, after having attended the meetings of the Portland Cement Association in New York on the 16th, 17th and 18th. Mr. Smith plans to make a complete motor tour of the British Isles while away.

E. E. Duffy of the Portland Cement Association's general education bureau has been sent down to the Mississippi river flood area to make a general survey of the situation. This step was taken by the association with a view to assisting in any co-operative effort that may be undertaken to devise methods and means of flood prevention and control.

William B. Senseman has been appointed Pacific coast district manager for Combustion Engineering Corp., Raymond Bros. Impact Pulverizer Co., Ladd Water Tube Boiler Co. and Heine Boiler Co., all subsidiaries of International Combustion Engineering Corp. The new consolidated offices are located in the Subway Terminal Bldg., 417 S. Hill St., Los Angeles, Calif.

W. C. Davis, president of Foote Bros. Gear and Machine Co., and **Frank P. Callaghan**, vice-president and chief engineer, recently made a tour of the eastern sales offices of the company for the purpose of conferring with regard to the territorial questions and sales policies for the future.

E. L. Parsons, formerly district manager for the Ramsey Chain Co. of Boston, has recently joined the sales force of the Foote Bros. Gear and Machine Co. and has been appointed district representative for that company for the state of Wisconsin and northern Illinois, with headquarters at 49 E. Wells St., Milwaukee.

Charles Warner, president of the Charles Warner Co., Baltimore, Md., was recently elected a director of the Atlas Powder Co.

A. L. Strong has been made district engineer in charge of the new office recently opened in the Montana National Bank Bldg., Helena, Mont., by the Portland Cement Association.

Mr. Strong has been on the district office staff of the association at Yakima and Seattle, Wash., since 1920. Prior to this he had been engaged for 10 years in city and county engineering.

T. E. Cocker, who for six years was district manager of the Chain Belt Co.'s Buffalo office, is now in charge of their Cleveland office at East 200th St. and St. Clair Ave. After graduating from the Rensselaer Polytechnic Institute in 1907, Mr. Cocker was connected for 11 years with the engineering department of the New York Central Railroad. Later he was with the Hancock Engineering Co. and the Standard Conveyor Co. In 1921 he became connected with the Chain Belt Co. in the capacity of district manager for the Buffalo office. Mr. Cocker will now have charge of the sale of "Rex" chain, transmission machinery and conveying systems in the Cleveland territory.

T. P. Gaylord, acting vice-president of the Westinghouse Electric and Manufacturing Co., has been elected president of the Pittsburgh Chamber of Commerce by the board of directors of that organization.

L. E. Beckwith, formerly assistant sales manager of the Davenport Locomotive Works, Davenport, Iowa, is now associated with E. S. Johnson in the contractors' equipment business at Davenport, under the firm name of the Johnson-Beckwith Equipment Co. Offices are maintained at 524 Union Bank Bldg.

H. W. Hardinge, president of the Hardinge Co., York, Penn., has been awarded the Edward Longstreth medal by the Franklin Institute of the State of Pennsylvania for his invention of a rotary air classifier, known as the Hardinge reverse current air classifier. Only three awards of this medal were made this year.

Manufacturers

E. I. du Pont de Nemours & Co., Wilmington, Del., has recently completed a new dynamite plant at Mineral Springs, near Birmingham, Ala. This is said to be the largest dynamite plant in the South, having an annual capacity of 15,000,000 lb. Some 50 separate buildings within an area of 1280 acres, equipped with modern machinery, comprise the new plant. A complete line of explosives will be manufactured.

Harnischfeger Corp., Milwaukee, Wis., announce the removal of their Dallas, Texas, office from 401 Fidelity Union Bldg. into the Construction Industries Bldg.

Lincoln Electric Co., Cleveland, Ohio, announce the appointment of the Wade Engineering Co., 1855 Industrial St., Los Angeles, Calif., as distributor of Lincoln products in California.

Denver Rock Drill Co., Denver, Colo., at its annual meeting May 16 re-elected all its directors and officers. They are: W. H. Leonard, chairman of the board; A. H. Skaer, president; A. J. Philpott and E. C. T. Pelham, vice-presidents; G. R. Grieve, secretary; H. E. Fiske, treasurer, and A. H. Bosworth.

Burch Plow Works, Crestline, Ohio, has changed its name to The Burch Corporation. November 30 has been decided upon as the end of its fiscal year. The personnel of the organization remains unchanged.

Trade Literature

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Diesel Engine. Bulletin on details of design and construction of De La Vergne vertical solid injection Diesel engine, for stationary power plant service. Data on injection systems, fuel consumption, lubrication, speed regulation, general specifications, etc. Illustrated throughout. DE LA VERGNE MACHINE CO., New York.

Benz Diesel Engine. Bulletin 744 on the type RH40 Benz Diesel engine. Illustrations and data on design and capacities. Fuel cost comparisons for various engine types. CHICAGO PNEUMATIC TOOL CO., New York, N. Y.

Wire Cloth. Catalog No. 26 illustrating and describing double crimped heavy steel wire screens, wire cloth of various metals and alloys, etc., for different purposes. Tables of comparison of metric and English units, etc. NEWARK WIRE CLOTH CO., Newark, N. J.

Slurry Agitators. Catalog on the Minogue cement slurry agitator. MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

Air Filters. Reprint of "Air Filters in the New York Public Library," by J. H. Fedeler, distributed by the MID-WEST AIR FILTERS, INC., Bradford, Penn.

Marion 1-Yd. Shovels. Brochure illustrating and describing various types of Marion No. 7 power shovels for different work. Data on design, capacity, working ranges, etc. MARION STEAM SHOVEL CO., Marion, Ohio.

Backfillers. Bulletin BF-1 on the P & H Model 35 backfiller. Data on design, capacity and illustrations. HARNISCHFEGER CORP., Milwaukee, Wis.

Inundation and Central Mixing Products. Catalog on the Blaw-Knox inundation system for mechanical control of water-cement ratio for concrete production in central mixing plants. Details of bin design inundators; data on control, mixing. Illustrations and line drawings. BLAW-KNOX CO., Pittsburgh, Penn.